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# Commonwealth of Massachusetts

## First Annual Economic Report to the Governor and the General Court

DOCUMENTS  
COLLECTION

*"Toward a More Flexible Economy"*



Submitted by  
The Board of Economic Advisors  
to the Governor

DECEMBER 22, 1964





THE COMMONWEALTH OF MASSACHUSETTS  
BOARD OF ECONOMIC ADVISORS TO THE GOVERNOR  
15 SCHOOL STREET, BOSTON 02108

December 22, 1964

His Excellency, Endicott Peabody  
Governor of the Commonwealth of Massachusetts  
State House  
Boston, Massachusetts

Your Excellency:

In accordance with Chapter 7, Section 37 of the General Laws of the Commonwealth we are honored to transmit to you The First Annual Economic Report of the Board of Economic Advisors to the Governor, "Toward a More Flexible Economy."

This Report is a selective survey of the Massachusetts economy. In our selection we have been guided by our judgment of the crucial issues in the state economy. We have also taken into account the research already underway on particular problems so as to minimize duplication of effort. Thus, for example, we have not dealt with those economic issues specifically associated with urban development and education. We believe these to be among the most pressing issues facing the Commonwealth, but they are already under intensive investigation by other agencies. Considerations of time and availability of research resources have also been important guiding influences. These have restricted our investigation of the state's fiscal position to a projection of future revenues.

Respectfully submitted,

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James R. Nelson, Chairman

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Francis S. Doody, Member

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Richard S. Eekaus, Member





COMMONWEALTH OF MASSACHUSETTS

First Annual Economic Report  
to the  
Governor and the General Court

"TOWARD A MORE FLEXIBLE ECONOMY"

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## CHAPTER I

### SUMMARY AND RECOMMENDATIONS

The Massachusetts economy has displayed a high degree of resiliency in recent years in adjusting itself to profound changes in the level and composition of demand for goods and services and to new technologies. These adjustments have been necessary in part because of the decline of industries which once held a position of national leadership. The recent reductions in expenditures on military goods and services produced in Massachusetts have also been a major factor retarding the growth of the state's economy. The stimulus of the current national expansion has helped the Massachusetts economy to offset these depressing factors. National economic growth, for which there are favorable prospects in 1965, will continue to be the most crucial factor affecting the state's economy.

Lacking significant natural resources and special locational advantages, the Massachusetts economy has traditionally been one in which ingenuity resourcefulness and adaptability to new types of activity have been especially important. Since World War II the average per capita disposable income in the state has grown more rapidly than in the nation as a whole despite a substantially poorer record in employment growth. This has, in large part, been due to a continuing shift toward industries and jobs with a relatively high productivity, although employment grew in the early postwar period. Manufacturing in recent years has become less important. Employment and income in the service sectors, and in construction and trade have more





than made up these losses, however.

Typically the Massachusetts economy is more stable than that of the nation as a whole and neither expands nor contracts as much as overall levels of economic activity. In the expansion of the last four years, which has been the most buoyant and lasting of the postwar period for the nation as a whole, the Massachusetts economy has been especially laggard.

Whereas national employment has grown about 10 per cent since the economic expansion started in early 1961, Massachusetts employment has grown by only 3 per cent. The absolute decline in manufacturing employment has been the major retarding influence and this, in turn, reflects continuing declines in certain traditional lines of production and in the level of federal military expenditures.

The federal military budget is an unusually important influence in the state's economy. At least 10 per cent of the personal income of the state is directly related to this source and perhaps, another 10 per cent is indirectly related via induced effects on private expenditures.

The increased proportion of the military budget which was directed to Massachusetts industries after the Korean War was related to the growing importance of scientifically sophisticated weapons systems. Production of such systems relied heavily on the special knowledge and skills available in the state. With the research and development phase nearing completion and as the systems move into the production state, defense employment in Massachusetts has been





declining although the total military budget has remained virtually stable.

The research and development potential of Massachusetts has been important in creating new industries in the state and in attracting military contracts which have been major sources of employment. This research and development potential is, however, concentrated in the state's colleges and universities. Private industry plays a relatively smaller role in federally-sponsored research and development activities in Massachusetts than in the nation as a whole. Moreover, only a small fraction of the state's industries are research-oriented. The largest part of most industrial employment in the state is in industries which undertake relatively small amounts of research and development.

Massachusetts labor is relatively highly organized as compared to many states but not in comparison to the other major industrial states. The state's unions and employers have an unusually good record in maintaining industrial peace with a low amount of time lost in work stoppages. This good record has not, on the whole, been achieved at the cost of unusually large wage increases. As a result the state has maintained a relative wage position which makes labor costs in Massachusetts industries generally competitive with those of other states.

Massachusetts has several areas of substandard and persistent unemployment that have been certified as areas eligible for assistance by the Area Redevelopment Administration. Declining industries and highly seasonal economic activity have contributed to unemployment in



these areas. A variety of programs is now in operation to deal with the problems of these areas of high unemployment. Also numerous "pockets of poverty" exist in the state, although poverty in Massachusetts is generally below the New England and United States averages. The "war on poverty" is commencing in Massachusetts and the results promise to be beneficial though they will necessarily be slow forthcoming.

### Recommendations

As has been emphasized throughout, the Massachusetts state government, like others, has only limited ability to cope with some of the major economic problems of the Commonwealth. However, this should not deter it from acting vigorously where possible and appropriate. To be economically successful in providing income and employment for its citizens, the Massachusetts economy must be flexible and able to adapt itself readily to a changing national environment of new patterns of private and government demands, new technologies and new relative cost structures.

We propose no specific legislation in this report. Rather, in a number of places we have directed attention toward areas which deserve further study in order to develop legislative proposals and provide the basis for administrative action. The tax structure of the state should be re-examined having in mind the elimination of taxes and tax provisions which create barriers to adaptation of business firms and their resources to changing conditions. The unusually heavy reliance on the property tax is a major source of inflexibility. The state's





industrial promotion activities can be strengthened and extended. Tourism and service industries deserve special attention in addition to that given to manufacturing industries. The recent Department of Commerce reorganization provides a vehicle for this type of action. This includes provision for increased liaison activity to help bring new developments in technology to Massachusetts industry. The possibility of the University of Massachusetts assuming additional responsibilities in this area should also be investigated.

The state's economy has suffered from a number of discriminatory federal programs and regulatory practices. These include the following:

1. The federal government has enforced a program for restricting imports of crude oil and residual oils since March 1959, based on a national defense justification. Yet, there has been no study of the efficiency of the domestic petroleum industry in any way comparable to the efficiency studies performed in connection with the announced closing of defense bases. If Massachusetts is to assist in supporting the domestic petroleum industry in the interest of national defense, it should insist that <sup>consistent</sup> standards of economy be applied. The Secretary of the Interior has announced hearings on the petroleum import quotas, beginning in March, 1965. The Commonwealth of Massachusetts might well take the lead in insisting that savings to taxpayers and consumers be placed in a foremost position as an objective of these hearings.



2. Massachusetts has suffered a further disadvantage due to the uneconomic allocation of quotas for the importation of crude oil. The result is that Massachusetts has had to pay not only to protect domestic crude oil producers, but even to assist crude oil refiners in the interior of the country who could in any case not benefit from the use of imported oil. Thus, Massachusetts is denied an opportunity of cheaper gasoline, cheaper fuel, and a possible petrochemicals industry which its excellent geographical location for imported oil would amply justify.

3. Massachusetts producers of poultry have suffered in two ways in their competition with producers in southeastern states. First, the federal government has provided excellent waterways for the movement of grain and feed from the midwest to the southeast without charging tolls, whereas the nearest equivalent for many Massachusetts farmers, the St. Lawrence Seaway, is a toll facility. Second, the leading railroad serving the southeastern area has greatly improved its facilities for moving feed into its service area, and drastically reduced its rates. No such improvement, and no comparable reductions, have occurred in Massachusetts, although the Interstate Commerce Commission has power to act on rates.

4. Massachusetts railroads have been excluded from the rail merger proposals, in spite of the lucrative market for rail freight service provided by Massachusetts producers and consumers, and the very long average haul per ton





of freight moved into and out of the state. The Interstate Commerce Commission made no provision for Massachusetts railroads in permitting the Chesapeake and Ohio to control the Baltimore and Ohio, and in permitting the merger of the Norfolk and Western with the Nickel Plate and Wabash railroads. It has taken no action, so far, with respect to the New York Central-Pennsylvania merger proposal.

Policies designed to end the special burdens imposed on Massachusetts by these federal programs would strengthen substantially the state's own efforts to make its economy more flexible.



## CHAPTER II

### POSTWAR TRENDS AND CURRENT CHANGES IN THE MASSACHUSETTS ECONOMY

Massachusetts has traditionally been a high-income state and in recent years has even improved upon its relative position. Per capita disposable income in Massachusetts in 1963 amounted to \$2459 as compared to the average United States figure of \$2123. This provides the most comprehensive measure available of the comparative health of the state's economy. It includes wages and salaries, net income of owners of unincorporated businesses, income from interest and dividends and transfer payments which are mainly old-age, unemployment and veterans' benefits, but excludes such taxes as personal income and estate taxes. When states are ranked according to per capita disposable income, Massachusetts is ninth from the top in 1963 as is shown in Table II-1. Only five states with comparatively large populations ranked higher. The 1963 ranking includes Alaska which was not a state in 1946 when Massachusetts was tenth from the top in average disposable income. Thus, it can be said that in the post war period, if Alaska is omitted from consideration, Massachusetts has moved from tenth place to eighth place.

Judged by the increase in per capita disposable income which has been achieved in the postwar period, the Massachusetts economy has also done comparatively well. When states are ranked by the size of their absolute gain, Massachusetts appears fifth on the list as indicated in Table II-2, which presents the five states having the greatest dollar increase in average disposable income between 1946





TABLE II-1

POSTWAR PER CAPITA DISPOSABLE PERSONAL INCOMES  
 SELECTED HIGH INCOME STATES - SELECTED YEARS, 1946 - 1963  
 (in dollars)

	<u>1946</u>	<u>1950</u>	<u>1957</u>	<u>1963</u>
United States	1116	1354	1800	2123
Nevada	1441	1704	2140	2940
Connecticut	1389	1738	2443	2737
Delaware	1277	1760	2400	2706
California	1455	1650	2190	2564
Illinois	1352	1649	2185	2549
New York	1462	1673	2186	2537
New Jersey	1360	1625	2229	2521
Alaska	--	--	--	2472
Massachusetts	1226	1492	2038	2459
Maryland	1147	1404	1933	2398
Michigan	1181	1523	1961	2210
Wyoming	1221	1490	1774	2160
Ohio	1174	1464	1972	2147
Oregon	1241	1439	1703	2146
Washington	1253	1522	1884	2146
Pennsylvania	1135	1425	1877	2124
Rhode Island	1204	1502	1752	2123
Montana	1169	1478	1722	1950

Source: Survey of Current Business, August 1964, U. S.  
 Department of Commerce.



and 1963. Only four states had larger gains and of the top five Massachusetts is the largest in terms of population. Compared to the United States as a whole, Massachusetts per capita disposable income at \$1226 exceeded the national average of \$1116 by 9.9% in 1946. By 1963 the Massachusetts figure exceeded the United States average of \$2123 by 15.3%. Thus the Massachusetts per capita disposable income has grown by 100.6% over this period while the national average has grown by 90.2%.

In achieving this relatively high growth in average disposable income the Massachusetts economy has had to make continuing adjustments. Income earned in farming and mining has decreased and income earned in such sectors as manufacturing and services has increased substantially since World War II. By 1963 manufacturing produced 24.0% of the personal income of the state compared to 21.2% of the national personal income. Incomes earned in the service sector are also significantly higher in the state than in the nation: 9.2% as compared to 7.4%. Earnings from employment in the "Finance, Insurance and Real Estate" category contribute 3.8% to the state's personal income compared to 3.2% of the nation's. Thus the evidence indicates that the people of Massachusetts have continued to compensate for the state's limited natural resource endowment by specializing in sectors which, in fact, have a higher average labor productivity.

Two sources of income not directly related to employment are important in Massachusetts. Income from the ownership of property accounts for 14.2% of Massachusetts' personal income, compared with





TABLE II-2

INCREASES IN PER CAPITA DISPOSABLE INCOME -  
FIVE LEADING STATES, 1946-1963

	<u>Dollar Amount of Increase</u> <u>in Per Capita Disposable</u> <u>Income, 1946-1963</u>	<u>Population</u> <u>1960</u>
Nevada	\$1,499	285,000
Delaware	1,429	446,000
Connecticut	1,348	2,535,000
Maryland	1,251	3,101,000
Massachusetts	1,233	5,149,000

Source: Increases computed from data in Table II-1.  
Population data from Statistical Abstract of the  
United States.



TABLE II-3

1963 PERSONAL INCOME  
SELECTED MAJOR COMPONENTS

	<u>United States</u>		<u>Massachusetts</u>	
	<u>Personal</u> <u>Income</u> <u>(000 omitted)</u>	<u>% of</u> <u>Total</u>	<u>Personal</u> <u>Income</u> <u>(000 omitted)</u>	<u>% of</u> <u>Total</u>
PERSONAL INCOME	\$461,610		\$14,889	
Wage and Salary Disbursements	309,721	67.1%	10,113	67.9%
Contract Construction	17,827	3.9	472	3.2
Manufacturing	98,042	21.2	3,565	24.0
Wholesale and Retail Trade	55,720	12.1	1,845	12.4
Finance, Insurance and Real Estate	14,969	3.2	561	3.8
Services	34,361	7.4	1,373	9.2
Government	56,783	12.3	1,602	10.8
Non-Farm Proprietors' Income	37,610	8.1	968	6.5
Property Income	63,251	13.7	2,112	14.2
Transfer Payments	36,687	7.9	1,626	10.9

Source: Survey of Current Business





13.7% in the United States. This figure suggests a relatively greater accumulation of wealth and property-ownership in Massachusetts than in the nation. Finally, transfer payments produce 10.9% of personal income in Massachusetts, compared to 7.9% in the nation. While a detailed breakdown is not available, presumably it reflects in part relatively larger amounts of old age payments. In the Census of 1960 11.1% of Massachusetts' population was reported to be 65 years or over, compared with the United States percentage of 9.2%.

The rapidly growing long-term trend in incomes earned in service is particularly striking. Table II-4 presents a breakdown of United States and Massachusetts service incomes. The sources of the relatively high Massachusetts service income appear in the table as "Professional, Social, and Related" services and "Business and Repair" services. This indicates that Massachusetts concentrates on the relatively high-value professional and business services in the overall group of service income sources.

#### Employment in Massachusetts

Measures of employment are also of great significance in evaluating the performance of a region. Unlike the case with the Personal Income measure, the growth of employment in Massachusetts has proceeded at a slower pace than it has nationally. From 1946 to 1963 nonagricultural employment in the United States increased by 37%, while in the state it grew 15%, as indicated in Table II-5. These changes were of approximately the same order of magnitude as the population increases, which amounted to 34% in the nation and 15%



TABLE II-4

## SERVICE INCOME COMPONENT OF PERSONAL INCOME - 1963

	<u>United States</u>		<u>Massachusetts</u>	
	<u>Millions of Dollars</u>	<u>Percent of Total</u>	<u>Millions of Dollars</u>	<u>Percent of Total</u>
Service Income	\$34,361	100.0%	\$1,373	100.0%*
Hotels, etc.	1,724	5.0	45	3.3
Personal Services and Private House- holds	7,047	20.5	224	16.3
Business and Repair Services	6,629	19.3	314	22.9
Amusement and Recreation	2,322	6.8	47	3.4
Professional, Social and Related Services	16,639	48.4	742	54.0

\* Detail does not add to total because of rounding.

Source: From data in Survey of Current Business, August 1964,  
U. S. Department of Commerce.



in the state over the same period.

The rate of population growth in the state as a benchmark helps to place the changes within the state in perspective as compared with the national changes, which occurred against a background of a much more rapid population growth. If the state's employment had grown at a faster rate, its population would also have increased more rapidly, due in part to reduced outmigration. As an example, Connecticut has experienced a relatively rapid population increase since World War II, with nonagricultural employment up about 35% from 1946 to 1963, and with a significant amount of net immigration.

Individual industrial sectors of the economy, both nationally and in the state, have shown wide variations in rates of growth as shown in Table II-5. This chapter is concerned with overall industrial trends, so that the manufacturing detail will be discussed in the next chapter. While total Massachusetts nonagricultural employment increased from 1946 to 1963, manufacturing employment dropped from 722,000 to 663,000, a decline of about 8%, at a time when national manufacturing employment increased 16%. In 1963 manufacturing, still the largest source of jobs in the state, provided one of three of the state's nonfarming jobs, compared with three out of seven in 1946.

While, overall, manufacturing has been shrinking as a source of employment within the state, manufacturing durable goods employment grew by nearly 12% from 1947 to 1963. The greatest shrinkage was in nondurables, which lost 22% during the same period. At present





TABLE II-5

UNITED STATES AND MASSACHUSETTS NONAGRICULTURAL EMPLOYMENT  
1946 - 1963, AND PERCENTAGE CHANGE

	<u>United States</u> (Thousands)			<u>Massachusetts</u>		
	<u>1946</u>	<u>1963</u>	<u>% Change</u> <u>1946-1963</u>	<u>1946</u>	<u>1963</u>	<u>% Change</u> <u>1946-1963</u>
Nonagricultural Employment	41,674	57,174	+ 37.2	1,701,100	1,955,900	+ 15.0
Contract Construction	1,661	3,029	+ 82.4	54,400	81,800	+ 50.4
Manufacturing	14,704	17,035	+ 15.9	722,100	662,600	- 8.2
Durables	7,742	9,659	+ 24.8	(1947) 279,600	312,600	+ 11.8
Nondurables	6,692	7,376	+ 5.9	(1947) 451,100	350,000	- 22.4
Transportation and Public Utilities	4,061	3,913	- 3.6	127,700	102,200	- 20.0
Wholesale and Retail Trade	8,376	11,865	+ 41.7	338,800	400,700	+ 18.3
Finance, Insurance and Real Estate	1,697	2,866	+ 68.9	69,500	104,600	+ 50.5
Service and Miscellaneous*	5,581	8,931	+ 60.0	207,600	337,900	+ 62.8
Government	5,595	9,535	+ 70.4	181,000	266,100	+ 47.0
Population	141,400	189,400	+ 33.9	4,590,300	5,296,000	+ 15.4

\* Includes mining.

Sources: Employment and Earnings Statistics for States and Areas, 1939-1963, U. S. Department of Labor; and Survey of Current Business, U. S. Department of Commerce



durable goods provide nearly as many jobs as do nondurables in the state.

Employment in wholesale and retail trade is second to manufacturing as a job source, providing slightly more than one of five non-agricultural jobs (20.5%) in 1963. Since 1946, wholesale and retail trade employment has increased 18% in the state compared to 42% nationally.

Service employment gained 130,000 jobs from 1946 to 1963, the largest increase of any of the employment categories, in both absolute and relative terms. The Massachusetts percentage increase here was 63%, roughly comparable to the national rate. However, as was indicated in the discussion of Personal Income, Massachusetts has concentrated on the high-value service areas.

Federal, state and local government employment is the fourth largest major employment category in the state, providing nearly one in seven (13.6%) jobs. Between 1946 and 1963 total government employment increased 47% in Massachusetts, compared with a 70% increase in the nation. From 1958 to 1963 Federal employment in the state increased by 5,700 to 67,400. State and local employment in the same period increased by 25,000 to 198,700, with much of this increase occurring in the numbers of public school teachers.

Finance, insurance, and real estate provided about one in twenty (5.3%) of the state's nonagricultural jobs in 1963 compared with one in twenty-five (4.1%) in 1947. Both in the state and nationally this has been a rapidly growing employment area.





Contract construction has been another rapid growth area, both nationally and in Massachusetts. From 1946 to 1963 the national growth was 82% and the state growth was 50%.

Finally the transportation and public utilities group lost ground during the postwar period as an employment source both in the nation and the state. The drop from 1946 to 1963 was 3.6% in the nation and 20.0% in the state with much of the decline in railroad and public transit employment.

As a summary of the postwar employment trends in Massachusetts, it may be noted that of the various major industrial categories all but three gained at a more rapid rate than the rate of population increase in the state. In order of rates of increase these were services; finance, insurance, and real estate; contract construction; government; and wholesale and retail trade. However, durable goods manufacturing grew less rapidly than the state's population growth, while nondurable manufacturers and the transportation and public utilities group both experienced serious absolute and percentage declines in jobs.

#### Current Changes and Outlook

The current expansion of the Massachusetts economy, starting in early 1961, has paralleled, although at a reduced rate, that of the nation as a whole. This longest unbroken period of expansion since the great depression of the 1930's has carried the state's economy to new heights of employment and income, although regional and sectoral soft spots exist. The outlook for the immediate future



continues to be generally good. As in the past, the most crucial factor for Massachusetts will be the level of performance of the national economy. The economic outlook for the nation is promising over the near term. Several reasons exist for this. Private investment and consumption plans, as reported in various surveys, are encouraging. The federal income and corporate tax reductions of 1964 will continue to provide some stimulus. Expenditures of the states and local communities will continue to grow. Moreover, there is a substantial consensus that expects a continuation of the present business expansion at least through the first half of 1965. The available evidence for Massachusetts is consistent with this expectation.

#### Recent Business Expansion

The present national expansion is the third of the last decade. The first two expansions, starting in August, 1954 and in April, 1958 lasted for about 31 months and 22 months respectively. The current expansion started in February, 1961 and has now lasted 46 months.

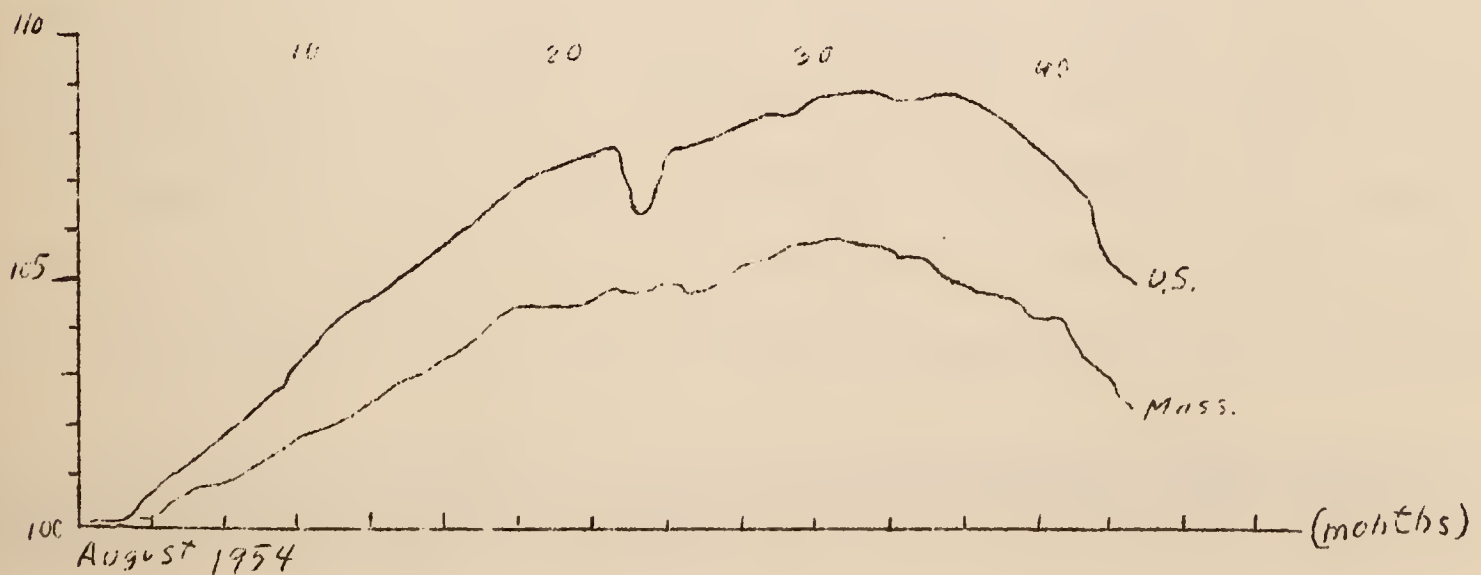
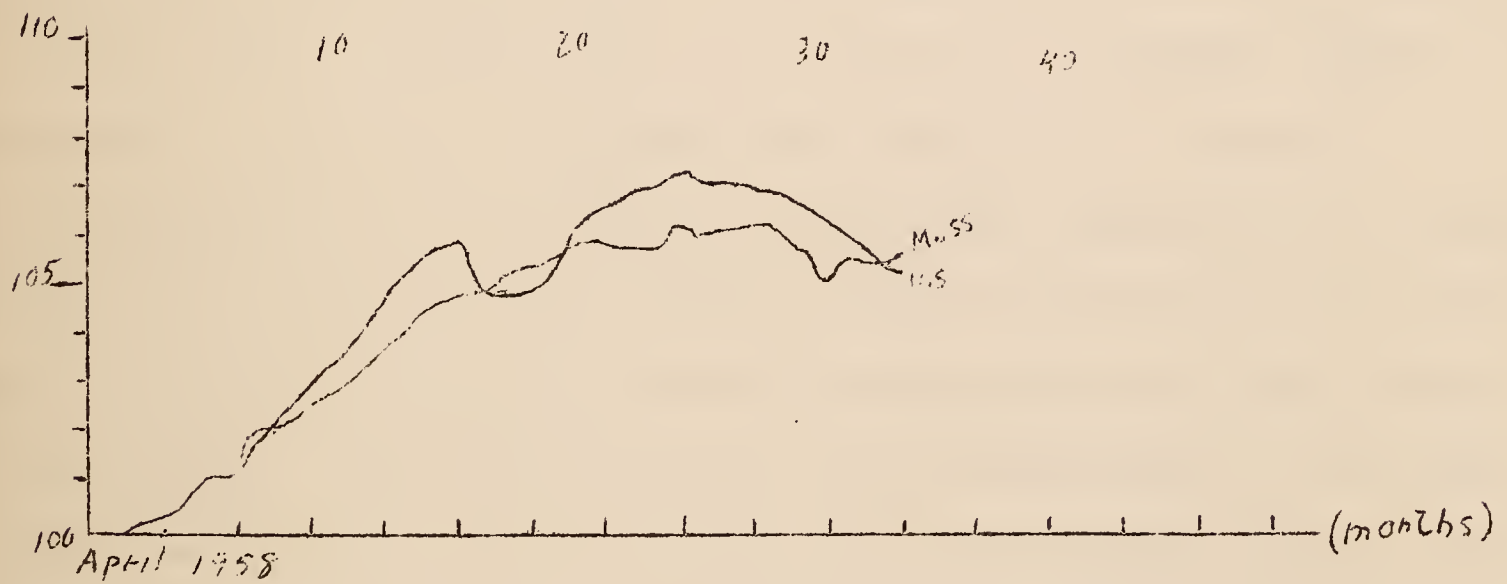
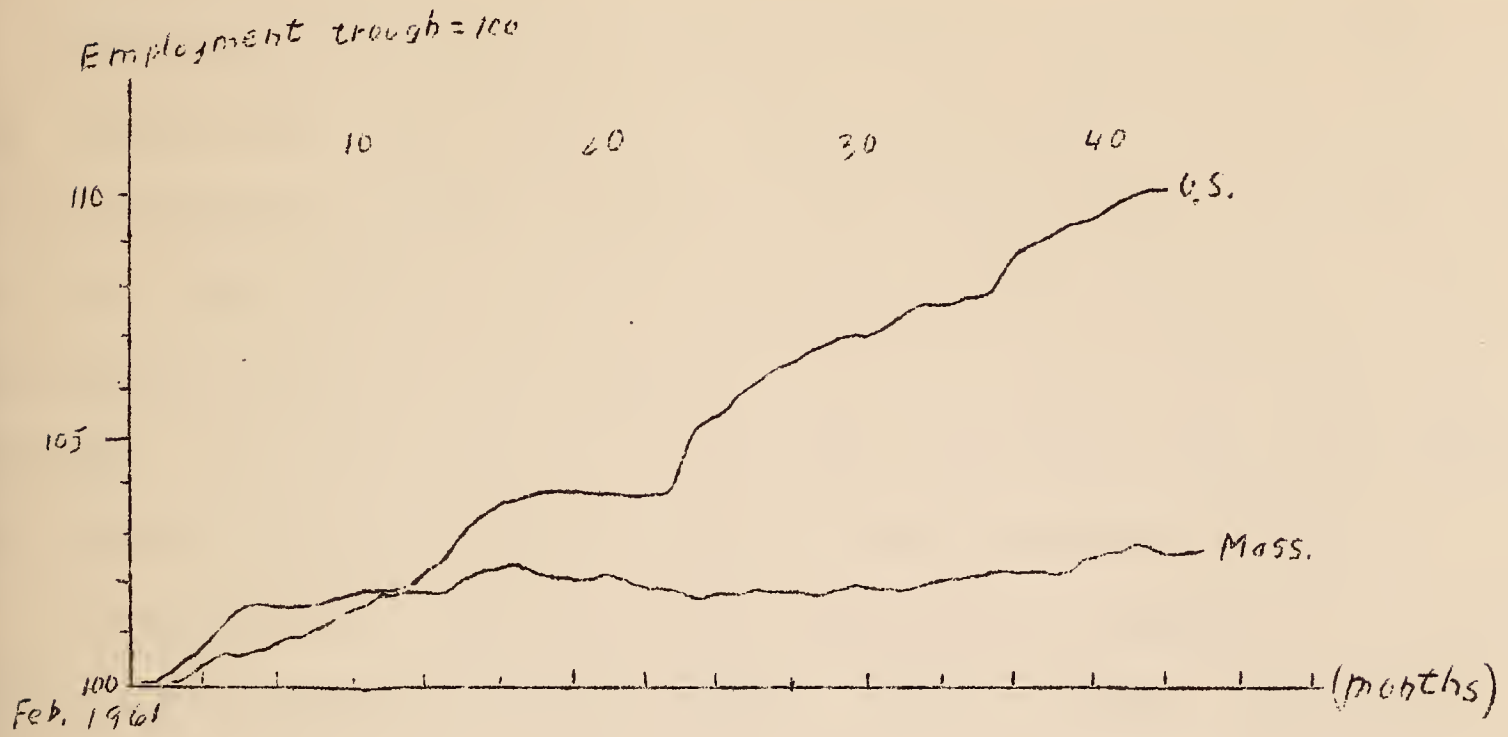
For an individual state the best available indicator of the economic cycle is total nonagricultural employment. Chart II-1 shows the state cycle in employment, compared to the national cycle, for the three most recent expansions. In this chart adjustments have been made in both the national and state data to eliminate purely seasonal influences. The chart indicates that the present expansion, on the national level, has reversed the pattern of the 1958-60 expansion which had been weaker than the preceding expansion.



Chart II-1

Massachusetts Employment in three Postwar expansions  
Compared to U.S. employment.

II-12a







The chart also shows the Massachusetts economy to be typically less buoyant than the national economy as a whole. This pattern of the Massachusetts economy over the last ten years is one which has persisted from previous years.<sup>1</sup> In the period from 1914 to 1953 the Massachusetts economy was among the most stable of all the state economies. In the past the pattern was associated with the relatively slow growth in manufacturing in the state discussed earlier.

In the current long expansion the lack of buoyancy in the state's economy has been particularly marked. While overall employment in the nation as a whole has grown by almost 10 percent from February, 1961, in Massachusetts it has grown by less than 3 percent. Since early 1962 the growth has been less than 1 percent, while, in the same period national employment has gone up by 7 percent.

An examination of the changing industrial composition of employment shows clearly that this lack of overall progress in the state is due to an absolute decline in manufacturing employment which dates from early 1962. The decline, while fairly widespread in the manufacturing sectors, has been concentrated in the durable-goods producing industries and especially in the ordnance, metals, electrical machinery and transportation equipment sectors. Such traditional manufacturing sectors as lumber, textiles, and leather also showed sizeable absolute declines. This contrasts with the previous two periods of expansion when most of these industries had substantial

<sup>1</sup> George H. Borts, Regional Cycles of Manufacturing Employment in the United States, 1914-1953, National Bureau of Economic Research, Occasional Paper 73, N. Y. 1960.



expansions, although in some cases against a longer-term tendency to decline. During the current overall upswing, the rapid expansion of the construction sector has been a major factor in offsetting the depressing effects of contraction in manufacturing. While roughly 40,000 jobs have been lost in manufacturing during the last 42 months, almost the same number were added in services and 15,000 workers were hired in the construction industry. Wholesale and retail trade has added about 13,000 employees and about 15,000 workers have been added in the financial and government sectors.

#### Unemployment

In an evaluation of the current expansion of business it is useful to take a look at the state unemployment situation. In recent years state unemployment rates, with unemployment measured as a percentage of the civilian labor force, have run very close to the national rates. Most of the differences in these two rates shown in the right-hand column of Table II-6 are so small as to be meaningless. However, in 1961 the United States rate exceeded significantly the Massachusetts rate, while the reverse happened during the winter of 1964. In the most recent fifteen months noted in the table the United States unemployment rate has been below the Massachusetts rate twelve times, although occasionally the differences were small or non-existent.

While Massachusetts jobs have been growing during the current business expansion, the rate has been below the national growth rate. Manufacturing declines, reflecting defense cutbacks and other causes, have occurred, while nationally manufacturing has shown a slight growth.





If the labor force had been a constant size the growth in the state's non-agricultural employment exclusive of manufacturing would appear to have been sufficient to reduce the unemployment rate. A growing labor force, however, increases the number of new jobs required.

That it has been new entrants into the labor force that have caused the state's rate to exceed the national figure slightly, as well as to be somewhat above the figures for a year ago is suggested by the fact that the numbers of insured unemployed in the state have been

recently running significantly below the figures for a year ago. New

unemployed entrants into the labor force, many of whom are youths, are not

reflected in the insured unemployment statistics, although they do appear in the unemployment data based upon the overall civilian labor force. In Chapter X the subject of youth unemployment is further discussed.

### The Near Term Outlook

The near term outlook for the Massachusetts economy remains strong and there are some signs that it may resume an upward trend in its employment and income. Although a comprehensive forecasting procedure has not yet been developed for the state, economic indicators are available which suggest this favorable outlook. Most important the economic outlook on the national level<sup>for</sup> at least the first half of 1965 is for a continuation of the present expansion.

In 1965 the continuing expansionary effects of the 1964 tax reduction will be somewhat lessened and there is no sign of an important increase in federal government spending to provide new



impetus to the economy, although state and local expenditures in the nation will continue upward. The outlook for new investment spending is quite good. The increases indicated by national surveys of business investment plans range from 5% to 8% in the first half of 1965 with the latter figure reported by the authoritative survey conducted by the U. S. Department of Commerce and the Securities and Exchange Commission. Inventory accumulation has been unusually cautious although the danger exists of excessive buildups in anticipation of a possible nationwide steel strike. Consumer demand is likely to follow the general upward trend and the effect of the proposed reduction in federal excise taxes would be to strengthen this source of demand. Although there is some growing apprehension about the second half of 1965, there is a substantial consensus that for the year as a whole the growth rate will be between four and five percent. Such a rate would fall perhaps two percentage points short of the growth achieved in 1964.

#### Policy Implications

The prospect of continued national growth is good news for Massachusetts. It is only in the context of an expanding national economy that readjustments in the state's industries can take place without imposing major problems of unemployment. While no capital expenditure plans for Massachusetts manufacturing are yet available, Table II-7 shows that the Massachusetts and the U. S. manufacturing capital expenditures tend to move together. Thus, the expected increase in such expenditures on the national level is also likely





TABLE II-6

UNEMPLOYMENT RATES AS PER CENT OF LABOR FORCE  
(Seasonally Unadjusted)

	<u>United States</u>	<u>Massachusetts</u>	<u>Excess (✓) or Deficit (✗)</u> <u>of U. S. Rate</u> <u>Over Massachusetts Rate</u>
1958	6.8%	7.0%	- 0.2
1959	5.5	5.4	✓ 0.1
1960	5.6	5.4	✓ 0.2
1961	6.7	6.0	✓ 0.7
1962	5.6	5.5	✓ 0.1
1963	5.7	5.8	- 0.1
January	6.6	6.8	- 0.2
February	6.9	6.8	✓ 0.1
March	6.3	6.7	- 0.4
April	5.6	5.7	- 0.1
May	5.6	5.3	✓ 0.3
June	6.4	5.9	✓ 0.5
July	5.7	6.4	- 0.7
August	5.2	5.3	- 0.1
September	4.8	4.9	- 0.1
October	4.7	4.7	0.0
November	5.4	5.4	0.0
December	5.3	5.7	- 0.4
1964 (Annual Rate thus far)	5.5	5.8	- 0.3
January	6.4	7.1	- 0.7
February	6.2	6.9	- 0.7
March	5.9	6.6	- 0.7
April	5.3	5.6	- 0.3
May	4.9	5.1	- 0.2
June	6.1	5.6	✓ 0.5
July	5.0	5.8	- 0.8
August	4.8	5.1	- 0.3
September	4.5	4.8	- 0.3



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to be favorable for the state. The decline in manufacturing industry which has been the major depressant to the state's economy may also be coming to an end. The Department of Defense data on prime contracts let in Massachusetts show an upturn which, if it continues, should be reflected in a higher level of manufacturing activity. Against that must be set the loss of jobs due to the planned closing of the Watertown Arsenal and Springfield Armory. Also the construction and employment that will be generated by establishment of the electronics center of the National Aeronautics and Space Administration in the Boston area will be an important stimulus to the state.

On the other hand the analysis of the state's recent employment trends presented earlier has some disturbing implications. Employment has grown only slowly during a period of vigorous national expansion. As a result the state may be more vulnerable to an economic decline. The present national expansion affords Massachusetts some breathing space in which to strengthen public and private efforts aimed at job creation and attraction of potential employers. To this end the recent reorganization of the state Department of Commerce is a forward step offering an opportunity for increasing the scope and effectiveness of the state's promotional efforts. In particular the relative importance of certain service incomes in Massachusetts suggests that a careful study be made of the causes of this so that Massachusetts' development efforts may be guided by detailed knowledge of factors that attract service businesses and personnel. This is not intended to minimize the importance of the quest for manufacturing firms, but only



to indicate that the effort should not be confined to this area.

State, economic policy cannot reasonably be expected to be able to counteract the external economic forces that impinge on Massachusetts from outside its borders and which are the major determinant of its general level of prosperity. However, the state can help create an economic system which is flexible and assists in the necessary changes. For example, it can try to insure that the state does not unintentionally act perversely to reinforce the economic cycle. At least two elements in the state tax structure deserve re-examination from this point of view. The unusually heavy dependence on the property tax in the overall finances of the state and local governments is an element of rigidity in the system now. The property tax burden remains more or less constant regardless of shortrun variations in the economic conditions of the community. Also the experience rating system for individual firms in the unemployment compensation laws contains an element of perversity. It forces higher costs of unemployment compensation on those firms least able to bear it, and at a time of maximum adversity. Many issues are involved in the experience rating question, but the question of cyclical perversity of the system is one that economists cannot overlook and the fact that all other states employ the system does not make it any less perverse in its operation.

One other tax deserves attention for its possible counter-cyclical and other implications. In 1962 the General Court enacted a tax credit clause providing modest tax reductions for firms investing in equipment having a life exceeding eight years. The results of this clause merit







careful study in order to determine the extent of its usage, its possible effects on the competitive position of the state and the possibilities of counter cyclical variation in rates.

TABLE II-7

CAPITAL EXPENDITURES IN MANUFACTURING IN  
MASSACHUSETTS AND THE NATION - 1954-1964

<u>Year</u>	<u>Massachusetts</u>		<u>United States</u>	
	<u>Total Manufacturing</u> <u>(1000's of Dollars)</u>	<u>Index</u>	<u>Total Manufacturing</u> <u>(Millions of Dollars)</u>	<u>Index</u>
1954	167,019	100	11,040	100
1955	220,131	132	11,400	104
1956	286,346	172	14,950	135
1957	332,985	199	15,960	144
1958	218,905	131	11,430	104
1959	282,022	169	12,070	109
1960	251,640	151	14,480	131
1961	269,894	161	13,680	124
1962	273,360	164	14,680	133
1963	300,493	183	15,690	142
1964	337,834*	202	18,270	165

\*Planned

Source: Federal Reserve Bank of Boston and Survey of Current Business,  
U. S. Department of Commerce.



## CHAPTER III

### MANUFACTURING IN MASSACHUSETTS

#### Introduction

The economy of Massachusetts is based mainly on manufacturing. As one of the leading industrial states, Massachusetts is more dependent upon such activity than the nation as a whole. About 35 percent of the non-farm workers in the state are engaged in manufacturing compared to 30 percent in the entire United States. The relatively high per capita income of Massachusetts (9th in the country in 1963) is due, in part, to the strong position of manufacturing compared to certain other types of economic activity which generate less income per person, (e. g., agriculture).

Notwithstanding these facts, manufacturing activity in Massachusetts has failed for several decades to grow at the national rate. Each successive post-war recession has seen manufacturing employment in the recovery period that followed level off on a lower plateau than before. Some of the major categories of industrial activity have declined only in relation to the United States as a whole, but each and every loss, absolute or relative, has contributed to a slower than average rate of economic growth in the state. It should be noted, too, that manufacturing employment as a percentage of total employment has been declining nationally for some time. This means that manufacturing cannot be expected to supply as many additional jobs in the future as can the rapidly-growing trade and service sector.

The changes in the composition of manufacturing activity in





the state have not been the result of random forces and factors. On the contrary, they have in large measure reflected structural and locational shifts in manufacturing at the national level.

The growth patterns of the various components of manufacturing activity in Massachusetts can be expected to change at differing rates in response to fundamental structural shifts in the national economy. The nature of the products, the methods of production, the resource requirements of the various industries, and the markets they serve have all undergone transformation in the recent past at a rate more rapid than ever before in our history and the pace is still accelerating. As a consequence, industries for which Massachusetts held relative advantages only a few decades ago have largely departed; and their places have been taken by growth industries which may in turn decline or be forced to relocate in the future. Because the regional redistribution of manufacturing is a never-ending process, the recent changes in Massachusetts and the reasons for them require careful and continual analysis.

Several different measures may be used to record changes in manufacturing activity. These include, among other possibilities, total employment, payrolls, value of shipments, and value added by manufacture. Total employment has been chosen as the basic variable of change in this chapter because (1) employment figures are more plentiful than other data; (2) most recent analyses of manufacturing change have emphasized employment shifts; and (3) employment statistics are most meaningful to the general reader who is likely to be





interested in numbers of jobs.<sup>1</sup>

### Recent Trends

The decline in Massachusetts manufacturing relative to the nation as a whole has been going on for a long time. In 1920, the industrial composition of the state was dominated by shoe and textile manufacturing. When sizeable absolute losses of employment in these industries became chronic due to out migration of a large number of firms during the 1920's and 1930's, the importance of the state as a manufacturing center deteriorated. However, the declines were checked during World War II, when the state shared the full employment condition of the nation. The war's end, however, witnessed the resumption of selective industrial decline. The relocation of the shoe industry continued, and woolen and worsted mills began to migrate to the South just as the cotton mills had done after World War I. Table III-1 presents a comparison of levels of manufacturing employment in Massachusetts for selected years since World War II.

Of the many developments in manufacturing since 1947, two seem particularly significant: First, post-war attempts to halt the decline in textiles and shoes have not succeeded in reversing the trend.

<sup>1</sup> Employment figures on manufacturing in Massachusetts are available from several sources: U. S. Censuses of Manufactures; surveys of manufacturing activity prepared by the Bureau of the Census; and monthly and annual estimates of non-agricultural employment prepared by the Division of Statistics, Massachusetts Department of Labor and Industries, in cooperation with the Bureau of Labor Statistics of the U. S. Department of Labor. To facilitate the comparison and analysis of data drawn from different sources, a grouping of manufacturing categories in accordance with the code of the 1957 Standard Industrial Classification Manual of the U. S. Bureau of the Budget has been used in this report, with emphasis on twenty major manufacturing industry groups identified by a two-digit code.



TABLE III-1

MASSACHUSETTS EMPLOYMENT IN MANUFACTURING  
SELECTED YEARS - 1947-1963

	<u>1947</u>	<u>1954</u>	<u>1958</u>	<u>1963</u>
	<u>(Thousands of Employees)</u>			
All Manufacturing: Total	730.7	692.2	665.7	662.6
Durable Goods	<u>279.6</u>	<u>290.2</u>	<u>295.1</u>	<u>312.6</u>
Electrical Machinery	60.0	80.1	82.7	88.6
Machinery, Except Electrical	81.1	67.8	63.4	70.2
Fabricated Metal Products	40.9	39.7	38.3	38.4
Instruments & Related Products	19.6	21.1	22.1	25.8
Primary Metals	24.8	22.4	22.4	20.8
Transportation Equipment	19.9	25.1	24.9	20.7
Ordinance	4.5	5.9	13.6	20.6
Furniture and Fixtures	10.6	12.3	11.9	11.8
Stone, Clay and Glass	9.4	10.1	10.3	10.4
Lumber and Wood Products	8.8	5.8	5.5	5.3
Non-Durable Goods	<u>451.1</u>	<u>401.9</u>	<u>370.5</u>	<u>350.0</u>
Apparel and Related Products	52.8	59.1	58.5	58.0
Leather and Leather Products	74.3	67.4	60.8	50.1
Textile Mill Products	122.1	71.3	50.8	43.1
Food and Kindred Products	51.7	50.4	47.5	42.6
Printing and Publishing	36.2	37.0	37.7	40.6
Paper and Allied Products	34.4	35.1	35.5	36.0
Rubber and Plastic Products	35.1	30.9	33.5	35.3
Chemicals and Allied Products	16.8	17.1	18.2	18.2
Miscellaneous	27.7	33.6	28.0	26.1

Source: U. S. Department of Labor, Bureau of Labor Statistics,  
Employment and Farming Statistics for States and Areas,  
1939-63.





Employment in textile products declined from roughly 122,000 in 1947 to 43,100 in 1963 while leather and leather products fell from 74,000 to about 50,000.

Secondly, employment in electrical machinery, the great post-war growth industry for Massachusetts, climbed rapidly, especially to 1954. The increase was from 60,000 in 1947 to 80,100 in 1954 and then to 88,600 in 1963.

National trends in manufacturing employment as seen through census data (Table III-2) show 1962 employment in both textiles and shoes to be substantially below the 1947 figures. This type of employment has experienced a greater relative decline in the state than in the nation.

To facilitate comparison of relative changes in the durable and non-durable goods industries, the major industry categories have been grouped in our tables according to their status as durables or non-durables. Nationally, the greater employment growth in recent years has come in the durable goods sector. Military needs, the hardware requirements of the space age, the private and public investment boom, and a high growth rate of demand for durables have tended to favor this category. In Massachusetts, however, only electrical machinery, instruments and related products, and ordnance have realized significant increases. Employment in the other categories of durable goods either remained relatively stable through the postwar period, or in the cases of machinery and lumber and wood products has declined perceptibly. In the nation, the only durables to show decreases in the 1947-63 period were lumber products and primary metals.



The non-durable goods have, on the whole, not fared as well in recent years as have the durables. Nationally, employment in the category increased only 217,000 between 1947 and 1963. With this situation prevailing, absolute losses in some industry groups could be anticipated. Textile mill products declined sharply, followed by smaller losses for leather products, and food and kindred products. The greater increases took place in printing and publishing, chemicals and allied products, and printing and publishing.

It has been Massachusetts' misfortune to have specialized in the two non-durable sectors--textiles and leather goods--that have declined the most nationally. On the other hand, apparel employment has increased at a more rapid rate in the state than in the nation. Printing and publishing also shows up as a growth industry in Massachusetts. For the most part, however, employment gains in these and other industries have been modest and have failed to offset the sharp losses in textiles and shoes.

The recent manufacturing situation in Massachusetts has been summarized in a publication of the Federal Reserve Bank of Boston:

... The trend of manufacturing employment in Massachusetts began to fall and to diverge from the rest of the region and the United States at the beginning of 1962. Ever since, the gap has widened steadily. In comparison with the 1957-59 period, Massachusetts' level of employment in soft goods industries was consistently lower than its neighbors' and the Nation's over the 1960-63 period, but the level in the





TABLE III-2

UNITED STATES EMPLOYMENT IN MANUFACTURING  
SELECTED YEARS - 1947-1962

<u>Industry Group</u>	<u>1947</u>	<u>1954</u>	<u>1958</u>	<u>1963</u>
	<u>(Thousands of Employees)</u>			
All Manufacturing: Total	15,545	16,314	15,945	16,859
Durable Goods	<u>8,385</u>	<u>9,129</u>	<u>8,830</u>	<u>9,659</u>
Electrical Machinery	1,035	1,190	1,249	1,582
Machinery Except Electrical	1,375	1,418	1,362	1,520
Fabricated Metal Products	989	1,070	1,077	1,153
Instruments & Related Products	267	321	324	372
Primary Metal Industries	1,279	1,219	1,154	1,166
Transportation Equipment	1,275	1,754	1,607	1,614
Ordinance	27	103	145	277
Furniture and Fixtures	346	342	361	390
Stone, Clay and Glass	537	553	562	608
Lumber and Wood Products	845	708	615	586
Miscellaneous	421	391	373	393
Non-Durable Goods	<u>7,159</u>	<u>7,185</u>	<u>7,116</u>	<u>7,376</u>
Apparel and Related Products	1,154	1,184	1,172	1,298
Leather and Leather Products	412	373	359	380
Textile Mill Products	1,299	1,042	919	890
Food and Kindred Products	1,799	1,818	1,773	1,738
Printing and Publishing	721	814	873	928
Paper and Allied Products	465	531	564	621
Rubber and Plastic Products	323	328	344	409
Chemicals and Allied Products	649	753	794	866
Petroleum Refining	221	238	224	188
Tobacco	118	103	95	89

Source: U. S. Department of Commerce, Office of Business Economics,  
Business Statistics, 1963 Edition, Pp. 68-69.





durable goods sector was high enough to offset this through 1961. After that, however, employment in hard goods began to decline. Now it is lower than the average for the remaining states of the region and for the Nation...<sup>1</sup>

Employment changes in manufacturing for recent months are suggested by Table III-3. During this period manufacturing employment dropped by a net amount of 10,600. Most of the drop was accounted for by defense cutbacks in ordnance amounting to 5,000 jobs and electrical machinery involving 4,700 jobs. Textile products also lost 3,300 jobs and leather and leather products 1,200. Minor gains were registered by most other manufacturing categories. Detailed consideration of defense changes and their impacts upon the Massachusetts economy is presented in Chapter V.

#### Some Causes of the Changes

The preceding sections have provided a general survey of basic employment trends in Massachusetts since World War II. Massachusetts has suffered from heavy commitment to the nationally declining textile and leather industries and from a failure to capture larger shares of the growing durable goods industries (excepting, of course, electrical machinery and instruments). For a variety of reasons, Massachusetts has been unable to retain even a constant share of the textile and shoe industries; thus, she has found herself in the worst of all

<sup>1</sup> "New England's Inconstant Growth Rate", New England Business Review, December, 1963, p. 6.

1. The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's history and development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's history and development.

2. The second part of the report deals with the country's economy. It is a very interesting and informative study of the country's economic development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's economic development.

3. The third part of the report deals with the country's social and cultural development. It is a very interesting and informative study of the country's social and cultural development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's social and cultural development.

4. The fourth part of the report deals with the country's political development. It is a very interesting and informative study of the country's political development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's political development.

5. The fifth part of the report deals with the country's foreign relations. It is a very interesting and informative study of the country's foreign relations. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's foreign relations.

6. The sixth part of the report deals with the country's military development. It is a very interesting and informative study of the country's military development. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's military development.

7. The seventh part of the report deals with the country's education system. It is a very interesting and informative study of the country's education system. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's education system.

8. The eighth part of the report deals with the country's health care system. It is a very interesting and informative study of the country's health care system. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's health care system.

9. The ninth part of the report deals with the country's environment. It is a very interesting and informative study of the country's environment. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's environment.

10. The tenth part of the report deals with the country's future. It is a very interesting and informative study of the country's future. The author has done a great deal of research and has gathered a wealth of material. The report is well written and is a valuable contribution to the study of the country's future.

possible positions, with declining shares of these nationally declining industries. Textile and shoe manufacturing moved to other regions where low wage rates, special tax concessions, other cost-saving factors and market shifts proved to be powerful attractions. While textiles migrated southward, firms in the shoe industry moved further north to New Hampshire and Maine.

Why has the state been preferred by electrical machinery, apparel, and miscellaneous industries? Part of the answer lies in the fact that Massachusetts herself remained a low-wage area relative to almost every region but the South. This feature plus the availability of a plentiful supply of female labor induced a portion of the apparel industry to decentralize from the Middle Atlantic region (primarily New York City) to the industrial centers of the state. Massachusetts also gained a number of machinery and fabricated metals firms that might conceivably have chosen a location nearer to raw materials. The growth of electrical machinery, particularly, lay in such factors as the desire for proximity to academic centers of science and technology, and the need for plentiful labor. Both were to be found in the vicinity of Rt. 128 around Boston, which became an attractive industrial setting in the postwar era. Many of the firms which have located there are research-oriented or devoted to small-scale manufacturing of a highly specialized nature. (Over 100 of the more than 300 firms which have located on Rt. 128 since its opening are concerned with electronics or space projects.) Instruments and miscellaneous industries also have been attracted to the Greater Boston area by





TABLE III-3

RECENT MANUFACTURING EMPLOYMENT CHANGES  
 MASSACHUSETTS  
 (Thousands of Employees)

	1963	Sept. 1964	Amount of Change <u>1963-</u> <u>Sept. 1964</u>
All Manufacturing	662.2	652.0	- 10.6
Durable Goods	<u>312.6</u>	<u>305.3</u>	- <u>7.3</u>
Electrical Machines	88.6	83.9	- 4.7
Machines, Except Electrical	70.2	69.4	- 0.8
Fabricated Metal Products	48.4	38.9	+ 0.5
Instruments and Related Products	25.8	26.2	+ 0.4
Primary Metal	20.8	20.8	-
Transportation Equipment	20.7	21.5	+ 0.8
Ordinance	20.6	15.6	- 5.0
Furniture and Fixtures	11.8	12.9	+ 1.1
Stone, Clay and Glass	10.4	10.8	+ 0.4
Lumber and Wood Products	5.3	5.3	-
Non-Durable Goods	<u>350.0</u>	<u>346.7</u>	- <u>3.3</u>
Apparel and Related Products	58.0	57.9	- 0.1
Leather and Leather Products	50.1	48.9	- 1.2
Textile Mill Products	43.1	39.8	- 3.3
Food and Kindred Products	42.6	43.0	+ 0.4
Printing and Publishing	40.6	40.8	+ 0.2
Paper and Allied Products	36.0	35.5	- 0.5
Rubber and Plastic Products	35.3	35.7	+ 0.4
Chemicals and Allied Products	18.2	18.1	- 0.1
Miscellaneous	26.1	27.0	+ 0.9

Source: U. S. Department of Labor Bureau of Labor Statistics,  
Employment and Farming Statistics for States and Areas,  
1939-63.



similar factors.

On the other hand, many firms in industries such as chemicals, metal fabrication, non-electrical machines, and transportation equipment have been oriented more toward markets and materials than they are to labor sources, leaving Massachusetts at a disadvantage in attempting to compete for these industries. Yet the recent success that Massachusetts has experienced in attracting certain types of manufacturing shows that the state cannot be crossed off as unattractive to new industry. Moreover, Connecticut, her immediate neighbor to the south, has recorded impressive over-all employment gains in manufacturing due to her relative success in attracting a share of the fastest-growing durable goods industries of the nation.

#### Employment Shift Analysis

In recent years a new tool of regional economics, called "employment shift analysis" has been developed<sup>2</sup>. Shift analysis studies employment changes in terms of "comparative" gains and losses rather than absolute gains and losses. A comparative gain or loss indicates the extent to which employment for a given industry group in the state exceeded or fell short of the level it would have had if it had grown at the U. S. rate during a given period.

It was calculated by this technique that between 1929 and 1954 Massachusetts fell short by 317,000 jobs of the level of manufacturing

<sup>2</sup> For a fuller explanation of this technique than will be attempted in this report, see Edgar S. Dunn, "A Statistical and Analytical Technique for Regional Analysis", Papers and Proceedings, Regional Science Association, Vol. VI, 1960, pp. 99-112.





employment it would have attained had it grown at the same rate as the entire nation.<sup>3</sup> This was the second largest "comparative loss" among all the states. The greatest comparative loss by far was in the cotton goods industry (50,000 jobs). Other comparative losses amounting to more than one percent of the state's total 1954 manufacturing employment were experienced by footwear, machinery, pulp and paper mills, paper and board products, rubber products, and woolens and worsted products. It should be emphasized that these are comparative losses only; in some of these industries, absolute gains in employment occurred. Comparative gains of more than one percent of 1954 total manufacturing employment took place in "engines, turbines, and tractors" (gain of 13,000 jobs) and "women's and children's clothing" (10,000 jobs).

For the shorter period from 1947 to 1954, the terminal year of this analysis, comparative losses of more than one percent of total manufacturing employment were concentrated in textiles; cotton goods were down 14,000 jobs on this basis and woolens and worsteds, 7,000. Electrical machinery showed a comparative gain of 8,000. These findings re-enforce the preliminary conclusions already reached on the basis of absolute changes. In addition, the computations indicate comparative gains of 6,000 for apparel and modest relative increases for tobacco manufacturers and furniture. Comparative losses were

<sup>3</sup> Victor R. Fuchs, Changes in the Location of Manufacturing in the United States Since 1929, (New York and London: Yale University Press, 1962).





typical in other categories, with those in paper, chemicals, fabricated metal products, and machinery being the largest.

#### Industry-Mix and Regional-Share Effects

In employment shift analysis, changes in employment are explained as due either to "industry-mix" effects, "regional-share" effects, or some combination of the two. Much of the employment change in a state can be "explained" as a manifestation of national rates of change in the industries which that state possesses. All industries are designated either as "rapid-growth" or "slow-growth" industries by comparing each industry's national rate of employment change with the national average for all industries. A state possessing a preponderance of rapid-growth industries would show a relatively high rate of employment growth. The reverse would be true if slow-growth industries were more important in the state. The net influence of national rates of employment change in the rapid-growth and slow-growth industries contained in the state upon that state's employment level has been termed the "industry-mix" effect.

In most cases, the industry-mix effect does not fully "explain" the employment changes that have taken place. The unexplained residue can be interpreted as the resultant of the state's industries growing more rapidly or more slowly than their counterparts in other states or regions. Change of this type is an index of the relative locational appeal of a state for rapid- and slow-growth industries of all kinds; it has been termed the "regional-share" or "local-factor" effect. By separating total employment change in Massachusetts manufacturing into



portions attributable to industry-mix and regional-share effects, a clearer view of the nature of recent trends can be obtained.

A study of shifts in total employment between 1939 and 1958 in Massachusetts, found that a positive shift due to the industry-mix effect was more than offset by a negative local-factor effect. Of the total local-factor net shift of -468,405, more than one-half (or 242,108) was due to a downward local-factor shift in manufacturing.<sup>1</sup>

To put it another way, Massachusetts (in company with such other industrial states as Rhode Island, New York, Pennsylvania, and Illinois) gained jobs in some manufacturing categories more rapidly than the nation as a whole due to a moderate specialization in rapid-growth durable goods manufacturing; these gains, however, were more than counterbalanced by relative losses in other industry groups due to a worsening of the relative competitive position of the state for manufacturing in general, irrespective of their growth rates at the national level. The net result in Massachusetts was a downward shift in total employment, signifying a slower rate of statewide growth than the nation experienced during the period.

Downward regional-share shifts in total manufacturing employment in the state explained a very large portion of the total employment losses attributable to the local-factor effect. Even so, some segments of manufacturing activity ran counter to the trend, with positive local-

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<sup>1</sup> Harvey S. Perloff, How a Region Grows, Committee for Economic Development, Supplementary Paper No. 17, March, 1963, p. 78.





factor shifts. These were restricted largely to three types of situations:

"(1) industries seeking to utilize the surplus labor created by the migrating textile industry (apparel and electronics), (2) industries that are in a decentralizing phase (rubber and transportation equipment), and (3) industries adjusting to a regional surplus supply situation (primary metals)...<sup>1</sup>

Applying this analysis to our earlier findings with respect to changes, we might say that the state's gains in apparel have been almost solely due to the regional-share effect, and that the gains in rubber and electronics (electrical machinery) have been due to both the industry-mix and regional-share effects. Massachusetts does not seem to have benefited greatly from the local-factor shifts that occurred nationally in transportation equipment and primary metals, since these are still two of her less important manufacturing categories.

### Conclusion

The recent statistical analyses of employment shifts cited above point to the following important conclusion: The progress Massachusetts manufacturing has made in recent years has not been due to any basic improvement in its regional-share position in attracting new firms. Instead, the explanation lies in the acquisition of a more

<sup>1</sup> Harvey S. Perloff et al, Regions, Resources, and Economic Growth, Baltimore, The Johns Hopkins Press, 1960, p. 483.



favorable industry-mix. In the post-war period, the state has substituted fast-growing industries like electrical machinery and instruments for slow-growing or declining industries like leather and textiles. But even the growth industries are apparently now beginning to find Massachusetts less desirable as a location than competing states and regions.

The present downward trend in total government spending for defense and space related activities, accompanied by changes in the regional distribution of prime military contracts, poses problems because of its impact upon the electronics activity in which Massachusetts has so large a stake.

A projection of recent Massachusetts employment trends into the immediate future would produce further declines in ordnance; communication equipment and electronic components (sub-groups of electrical machinery); primary metals; transportation equipment; food; textiles; and leather and leather products. Only instruments and related products, and printing and publishing show signs of expansion at present. A relatively stable employment situation seems indicated for lumber and wood products; furniture, stone, clay and glass; fabricated metal products; machinery except electrical; apparel; paper; chemicals; and rubber. Many events, of course, may occur that will turn around one or more of these trends.

Massachusetts enjoys a greater industrial diversification today than in decades past. Although few of her industries are growing, many of them seem to be resisting decline. It is upon this solid base





that the state must build an industrial structure of manufacturing activities with greater growth potential than those she currently possesses.

Although the post-war decline in total manufacturing employment in Massachusetts has been of serious dimensions, the situation would have been much worse had the state not succeeded in diversifying its industrial structure to a greater extent than in the era when shoes and textiles were the major manufacturing groups. The shock of the recent loss of employment in electrical machinery has to some extent been cushioned by the steady performance of other major groups. Still further diversification is within reach, since most industries in the nation are now becoming more dispersed geographically. Regional specialization in every area declined between 1940 and 1960.

The future position of manufacturing in Massachusetts relative to the nation depends in large measure upon the state's ability to diversify further its industrial structure by capturing larger shares of the rapid-growth manufacturing sectors (paper, printing, rubber, chemicals, stone, clay and glass, ordnance, metals, instruments, electrical machinery, and non-automotive transportation equipment). In such diversification, the state may be expected to attract primarily companies with a "foot-loose" orientation rather than those which are resource- or market-oriented.





## CHAPTER IV

### THE IMPACT OF DEFENSE EXPENDITURES ON THE ECONOMY OF MASSACHUSETTS

Massachusetts ranks among the top half dozen states in the country in terms of the production of military goods. In recent years between 4 and 5 per cent of all military prime contracts have been awarded within the state, a share which exceeds that of the area's population and income by more than a third. Somewhere between 7 and 10 per cent of the productive resources of the state have been tied up in military production in recent years. At least 10 per cent of the Personal Income of the state flows directly from this source. If the secondary, or indirect, effects of consumer and business expenditures are taken into account, the volume of income stimulated by military demands may be as much as twice as high.

The share of the Gross National Product in the United States represented by military expenditures has tended to be over 9 per cent of the total during the last decade. This has rendered the economy as a whole particularly sensitive to changes in the amount and composition of the defense budget. In supplying more than its share of military needs, Massachusetts has become more dependent than most states on a steady or rising flow of Department of Defense purchases to sustain its economy. This is true not only because of the comparatively high rate of defense production in the state but is due also to the highly specialized nature of this production and the skills involved.

Following the post Korean War cut-backs, Massachusetts has

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attracted until this year an ever-increasing share of total contracts awards. This trend had its origins in the growing importance in the military budget of programs to develop complex, new weapons systems which required the sophisticated scientific and technical skills that Massachusetts was able to provide. These programs have had an unusually large component of research and development expenditures. Today many of these programs are nearing completion. The period of research and development has in many projects given way to the production stage. Accordingly, Massachusetts employment is already reflecting the changing nature of defense procurement even though the military budget itself has remained fairly stable. The significance of military expenditures in the Massachusetts economy can be appreciated fully, however, only with the help of careful quantitative estimates. Since none of the data available for measuring the significance of such expenditures are perfect for the purpose, a variety of types of evidence must be marshalled.

#### Share of Massachusetts Economy Related to Military Production

At the request of the Board of Economic Advisors, the Division of Statistics of the Department of Labor and Industries, which conducts an annual census of manufactures in Massachusetts, made a special study of replies to questions bearing on defense related work for the year 1962. In the census, firms are asked to state the proportion of final production done on government defense contracts, either primary or secondary. The questionnaire relates only to manufacturing production and excludes all research and development

the first of these is the fact that the system is not self-sufficient. It is necessary to import a large quantity of raw materials and components from abroad. This is due to the fact that the domestic industry is not yet developed enough to produce these materials in sufficient quantities and of the required quality. The second point is that the system is not very flexible. It is not able to adapt quickly to changes in demand or to new technological developments. This is because the system is based on a fixed set of standards and procedures which are not easily modified. The third point is that the system is not very efficient. It involves a large number of steps and a great deal of bureaucracy, which leads to delays and increases the cost of production. Finally, the system is not very innovative. It does not encourage the development of new products or the improvement of existing ones. This is because the system is based on a rigid set of rules which do not allow for experimentation or the pursuit of new ideas.

These are the main weaknesses of the system. However, it is not without its strengths. One of its main advantages is that it provides a high degree of stability. The fixed standards and procedures ensure that the quality of the products is maintained at a high level. This is important for the reputation of the country and for the confidence of its trading partners. Another advantage is that the system provides a clear framework for the development of the industry. It sets out the rules of the game and provides a clear path for the industry to follow. This is helpful for investors and for the government in planning the development of the industry. Finally, the system provides a high degree of control. The government is able to monitor the industry closely and to intervene if necessary. This is important for the protection of the national interest and for the maintenance of the system.



performed.

The results of the survey show that in 1962 about 53,000 production workers or eleven percent of the total employed in private manufacturing in the state were working on defense contracts. Thirteen per cent of the value of final output in manufacturing industries fell in this category. However, since these figures exclude research and development and non-production workers, they undoubtedly understate the total number of persons engaged by private firms in defense work. In addition, the census does not cover those employed directly by the Federal government or those working for firms which sell part of their output "off-the-shelf" or without contracts for defense-related production. In defense industries as a whole in the United States production workers account for about 57 per cent of all employees. If production workers in defense industries in Massachusetts are also 57 per cent of total employees the total employment in military production in private industry in Massachusetts in 1962 would be closer to 93,000 or about 5 per cent of the state's total non-agricultural employment. Even this estimate is likely to be an underestimate as it does not fully take into account those engaged in research and development and other private non-manufacturing activities. Research and development contracts account for at least one-third of all military contracts to private firms awarded in the state and may in certain industries account for more than half the value of defense-related output. By another approach, total 1962 employment in those manufacturing industries which were primarily engaged in defense



production is estimated at 103.3 thousand, about 15 per cent of all manufacturing employment in Massachusetts, as shown in Table IV-1. The U.S. Bureau of Labor Statistics estimates that 80 per cent of workers in these industries are engaged in defense production. On the other hand, the Bureau calculates the number of persons working on defense production in non-defense industries to be almost as large as those in the defense industries proper, although the payroll implications of this estimate compared to the total defense budget make it seem somewhat excessive.

To employees engaged in military production in the manufacturing sectors must be added those involved in research and development, for which no direct employment estimates are available. Account must also be taken of persons engaged in research in non-profit institutions. Three to five thousand persons is perhaps a reasonable guess for the number engaged on the roughly \$100 million of research and development contracts awarded each year to non-profit institutions in Massachusetts.

Finally, civilians employed directly by the federal government in defense activities amounted to 28,721 in 1962. Even without the rather questionable estimates of employment related to military research and development activities, the total of direct civilian employment in private industry and the federal government on military production contracts probably amounted to over 130,000 in 1962, or about 7 per cent of all non-agricultural employment in Massachusetts. If persons engaged in research and development and those working on





TABLE IV-1

EMPLOYMENT AND EARNINGS IN DEFENSE INDUSTRIES  
IN MASSACHUSETTS - 1956-1962<sup>1</sup>

<u>Industry Group</u>	<u>Employment</u>		<u>Total Compensation of Employees</u>	
	Sept. 1956	Sept. 1962	(\$1000's of 1956	Dollars 1962
Ammunition, Except Small Arms <sup>2</sup>	762	14,057	2,918	870,060
Sighting & Fire Control Equipment	1,253	5,677	6,785	42,807
Small Arms	2,639	3,104	12,174	17,078
Ordnance & Accessories, n.e.c.	-	157	-	391
Subtotal: Ordnance	4,654	23,005	21,877	147,336
Communication Equipment	not avail.	31,310	not avail.	194,085
Electronic Components and Accessories	" "	28,869	" "	152,198
Aircraft and Parts	9,514	9,042		67,609
Ship and Boat Building and Repairing	7,229	8,023		55,764
Subtotal: Manufacturing	not avail.	100,249	not avail.	616,992
Business Services, n.e.c. (Inc. Research and Development)	10,506	28,842	43,963	172,343
Federal Government Civilian (Defense-Related)	29,337 <sup>3</sup>	28,721 <sup>3</sup>	14,000 <sup>5</sup>	150,000 <sup>6</sup>
Military	not avail.	37,052 <sup>4</sup>	184,000 <sup>5</sup>	161,000 <sup>6</sup>
Total Non-Agricultural Employment	1,880,000 <sup>7</sup>	1,983,400 <sup>7</sup>		
Compensation			7,481,000 <sup>8</sup>	9,752,000 <sup>8</sup>

Sources:

1. Unless otherwise noted, data are from the Commonwealth of Massachusetts, Division of Employment Security, Employment and Wages for the Year 1956, and same for 1962. 1962 is the latest year for which figures are currently available.
2. Includes missile frames.
3. U. S. Department of Labor, Bureau of Labor Statistics, Boston Regional Office
4. U. S. Congress, Joint Economic Committee, Background Material and Economic Aspects of Military Procurement and Supply, Pg. 5.
5. U. S. Department of Commerce, Office of Business Economics.
6. U. S. Department of Commerce, Statistical Abstract of the United States, 1964, Pg. 259.
7. Commonwealth of Massachusetts, Department of Labor and Industries, Division of Statistics. This total is used rather than that of D.E.S. because of its broader coverage. It differs chiefly from the latter in including government employees.
8. U. S. Department of Commerce, Survey of Current Business, August 1956 and 1963.





defense production in non-defense industries were included, the ratio would most likely exceed 10 per cent

By still another procedure the U.S. Bureau of Labor Statistics has itself estimated that civilians employed by the Department of Defense and manufacturing industries primarily engaged in defense production represented 6.5 per cent of total non-agricultural employees in the state in 1962. For the United States as a whole the figure is 5 per cent. In the B.L.S. calculations, Massachusetts, in percentage terms, ranks sixth in the nation and includes 4.6 per cent of all such employees in the country.

The same Bureau of Labor Statistics study shows that wage and salary disbursements to civilian and military personnel in defense related work throughout Massachusetts amounted to slightly over a billion dollars in 1962. Our estimate, in Table IV-1 which is somewhat more inclusive, is a little higher. Either represents over ten per cent of total wage and salary disbursements in the state.

#### Value of Production

Prime military contract awards in the state have run consistently over a billion dollars since 1959. The total reached a peak of \$1.3 billion in fiscal year 1962, but the average has hovered just above the \$1 billion mark, as shown in Table IV-2. Replies to the Department of Labor and Industries' census questionnaires in 1962 indicated that over \$1.4 billion of final product of manufacturers in the state was produced in fulfillment of defense contracts, either primary or secondary. This figure excludes military research and development,



TABLE IV-2

MILITARY PRIME CONTRACTS  
FOR MASSACHUSETTS AND THE UNITED STATES  
FISCAL YEARS 1951 - 1964

<u>Fiscal Year</u>	<u>(Millions of Dollars)</u>		<u>Massachusetts as a % of U. S.</u>
	<u>United States</u>	<u>Massachusetts</u>	
1951	29,519.5	894.6	2.1
1952	38,478.5	1,029.7	2.6
1953	26,994.2	688.9	2.6
1954	10,631.6	246.1	2.3
1955	13,971.6	332.0	2.4
1956	16,490.5	509.3	3.1
1957	19,855.3	604.7	3.3
1958	22,752.3	734.5	3.5
1959	23,902.0	1,150.5	5.2
1960	22,462.2	1,070.4	5.2
1961	24,304.7	1,072.4	4.8
1962	27,800.4	1,310.0	5.2
1963	28,107.9	1,060.2	4.2
1964	27,470.4	1,032.1	4.2

Source: U. S. Department of Defense, Prime Contract Awards by State, for various years, Tables 1 and 3, "Net Value of Military Procurement Actions for Supplies, Services and Construction by Fiscal Years." The Department of Defense emphasizes that data are prime contracts by State and do not provide any direct indication as to the State in which work is actually done.

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THE

NAME	RESIDENCE	AGE
J. H. B.	123 Main St.	25
W. C. D.	456 Oak St.	30
T. E. F.	789 Pine St.	28
M. G. H.	101 Elm St.	35
R. I. J.	202 Cedar St.	22
S. K. L.	303 Birch St.	32
P. M. N.	404 Spruce St.	27
Q. O. P.	505 Willow St.	38
U. R. S.	606 Ash St.	24
V. T. U.	707 Hickory St.	31
X. W. V.	808 Poplar St.	29
Y. Z. W.	909 Sycamore St.	33

THE



which accounted for about a third of a billion dollars in prime contracts in the state in that year. On the other hand, it may be subject to some double-counting to the extent that both prime and secondary contractors included the value of the same output in their replies. In addition the value of final production in a state is not a true measure of net value of production within the state. Unlike the United States as a whole a state is not a relatively self-sufficient economic unit nor is it possible to measure the flows of intermediate goods and services into and out of the state which are embodied in the state's production.

Table IV-3 presents estimates made in a recent study of the production of goods and services for defense purposes and the related personal income for Massachusetts for the years 1951 to 1961. Estimates in this extremely useful study are based on an allocation of federal government military purchases of goods and services, among the states and over time and among defense and non-defense industries. In this study the total value of goods and services produced in 1961 for national defense in Massachusetts is calculated at close to \$1.7 billion in 1961. Personal income resulting directly from these expenditures was estimated at \$1.3 billion, almost 10 per cent of state personal income in that year. About \$400 million of the value of goods and services represented wages and salaries of government military and civilian personnel employed in defense work, leaving the total contribution of the private sector at \$1.3 billion. This figure exceeds the



TABLE IV-3

ESTIMATED ANNUAL DEFENSE PURCHASES AND INCOME - 1951-1961  
(Millions of Dollars)

<u>Year</u>	<u>Estimated Annual</u> <u>"Defense Purchases"</u>		<u>Estimated "Defense</u> <u>Income" in Massachusetts</u>	
	<u>Massachusetts</u>	<u>United States</u>	<u>Amount</u>	<u>Per Cent</u>
1951	956	28,668		
1952	1,255	39,983	989	10.7
1953	1,314	42,234		
1954	996	34,045		
1955	908	32,102		
1956	1,010	33,457	804	7.5
1957	1,195	36,646		
1958	1,290	36,889		
1959	1,536	39,044		
1960	1,543	38,196		
1961	1,690	41,229	1,300	9.5

Source: Roger Edwin Bolton, "Defense Purchases and Regional Growth in the United States," Doctoral Thesis, Harvard University, December 1963.



value of prime military contract awards to Massachusetts in that year by about \$300 million.

On the whole it would appear that 7 to 10 per cent of the Massachusetts economy was directly involved in production for national defense in 1962. Since that was a peak year in terms of contract awards in the state, the present degree of involvement with military work is now significantly lower.

#### Growth of the Defense Industry in Massachusetts

The Massachusetts economy benefited from a major shift in the pattern of defense procurement at the end of the Korean War. The trend reflected revolutionary changes in weaponry, away from conventional mass production items such as tanks and other vehicles, mechanical weapons and ammunition, to missiles and electronic equipment. The concentration on fewer and more costly weapons units has put increasing emphasis on research and development, testing and evaluation of new weapons and on the use of far more intricate and sophisticated techniques of production. Missiles, which accounted for 5 per cent of hard good deliveries in fiscal year 1951, represented a third of all defense contract awards in 1961. Electronic contracts during the same period rose from 11 per cent to 18 per cent of the total. By 1961 the two combined accounted for more than half of all military hard goods contracts.

Along with the shift in types of procurement came a pronounced shift in the geographical distribution of contract awards to areas with special capabilities in producing the new weapons. New England and





the Pacific and Mountain regions gained at the expense of the Middle Atlantic and East North Central parts of the country. Massachusetts, with its concentration of educational, scientific and research organizations, was particularly well situated to supply the highly specialized scientific and engineering and technical skills, together with the specialized facilities and labor skills needed to fulfill the changing requirements of defense procurement.

The evidence suggests that these factors were the major influence in sustaining the growth of defense output in this state during the period from 1955 to 1962. Missiles, for example, accounted for 40 per cent of all military contracts awarded in Massachusetts by 1961, while electronics and aircraft each took up another 14 per cent of the total. Fifty-eight per cent of all contracts awarded in the United States for missiles are for research and development. In electronics the figure is 25 per cent.

The shift in the distribution of prime military contracts during the years following the Korean War reflects the reallocation of actual production. As Table IV-4 shows, Massachusetts was second only to California in benefiting from the new distribution of contract awards.

The relative dependence of personal income in the state on military contracts fluctuated substantially between 1951 and 1961. Defense expenditures are one source of outside demand for the state's output and it is useful to compare their growth with the expansion of all outside demand during the period in question. The growth of the relatively small, interdependent state economies depends in large



TABLE IV-4

MILITARY PRIME CONTRACT AWARDS  
PER CENT OF TOTAL IN SELECTED STATES

	<u>Fiscal Years</u> <u>1951 -- 1953</u>	<u>Fiscal Year</u> <u>1961</u>	<u>Change in</u> <u>Percent</u>
Losses: Michigan	9.5%	2.7%	- 6.8%
Indiana	4.5	1.6	- 2.9
Illinois	5.0	2.0	- 3.0
Ohio	6.3	4.5	- 1.8
Wisconsin	2.0	1.0	- 1.0
Gains: California	13.6	23.9	+ 10.3
Massachusetts	2.8	4.8	+ 2.0
Texas	3.2	5.1	+ 1.9
Colorado	0.2	2.1	+ 1.9
Florida	0.4	2.2	+ 1.8

Source: Office of the Secretary of Defense, The Changing Patterns of Defense Procurement, June 1962.





measure on demand for their output from outside their borders, or "export" demand. The failure of this outside demand to materialize leads also to a flagging of expenditures for goods and services produced for local consumption within the state. An estimated amount of personal income within each state which is derived from industries producing primarily for a national rather than a strictly local market is available. This includes other types of disbursements which originate outside the state.

In 1956 defense income was 15 per cent of "outside" income, and in 1961 it had grown to 18.7 per cent. More important, however, during the intervening years is the fact that 29 per cent of the growth in total "outside" income was accounted for by the growth in defense income alone.<sup>1</sup>

Employment trends in the state since the post-Korean benchmark date of 1956 reflect the importance of defense demand. During the years from 1956 to 1963 about 100,000 new jobs were created representing an increase of about 5 per cent in Massachusetts' non-agricultural employment. The total number of jobs in manufacturing actually fell, reflecting in part a nationwide shift from manufacturing to trades and services. Yet employment in durable goods manufacturing, in which almost a third of the jobs were in defense production at the end of the period, held its own for most of the period. The number of workers in the defense industries themselves, of course, rose substantially. Because of a change in classification of employment data

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<sup>1</sup> Roger Bolton, op. cit., pp. 139ff



in 1957, the exact increase in employment is difficult to estimate. However, leaving aside the electronics industry, for which data are not available for 1956, employment in Ordnance, Aircraft and Shipbuilding alone rose by almost 40,000. Employment in the Electrical Machinery industry as a whole, which includes Electronics, had a net increase of 11,000 though it fell at the end of this period. Many of the 18,000 job increases in "business services, n.e.c." undoubtedly reflected the expansion of defense research and development.

The number of new jobs created in major defense industries alone would appear from the foregoing analysis to have represented in the neighborhood of 60,000 of the roughly 100,000 net increase in jobs in the state between 1956 and 1962.

#### Trends in Defense Expenditures -- Current and Future

In the latter half of the 1950's, as we have seen, defense production in the state was influenced as much by the changing character of defense procurement as by the size of its budget. From 1956 to 1964 the increase in the total defense budget from \$40.7 billion to \$53.3 billion was accompanied by a rise in military procurement contracts from \$19.5 billion to \$27.5 billion. At the same time, awards to Massachusetts contractors grew from \$509 million to \$1,032 million.

The revolution in weaponry of the 1950's is not expected to be repeated on a similar scale in the 1960's but the geographical distribution of contract awards will no doubt continue to be influenced by changing procurement requirements. However, it is likely that in the near future a state's success in maintaining or increasing its volume of military contracts will tend to be more closely associated

The first of these is the fact that the  
 system is not a simple one. It is a  
 complex one, and it is not possible to  
 describe it in a simple way. It is a  
 system of many parts, and it is not  
 possible to describe it in a simple way.  
 It is a system of many parts, and it is  
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with the absolute amount of defense budget and the ability and willingness of its producers to compete in a tighter market than that to which they have been accustomed. Despite this, so long as military procurement continues to call for highly sophisticated weapons with a large research and development component, Massachusetts will remain in a favorable position to compete for its share of the budget. To quote from the Department of Defense publication, "The Changing Pattern of Defense Procurement":

"A region that gains a long head start in a new and expanding field of procurement is bound to enjoy an enduring advantage, especially when R&D is a primary element. Factors influencing the location of awards strictly on merit include availability of highly specialized scientific, engineering and technical manpower, specialized facilities, labor skills, production experience and know-how, together with competence and determination in presentation of bid proposals. All these tend to be associated with R&D capability, and their presence fosters the climate in which long-scale R&D may flourish.

In summary, successful research and design, or development and testing effort, often lead to follow-on production contracts; and, in turn, engineering work on highly complex new weapon systems creates new R&D capability. The process is circular; and it regenerates itself."

The size of the total defense budget in the years immediately ahead, barring unpredictable developments on the international scene, or uncalculated breakthroughs in technology, will probably remain at about its present level of close to \$50 billion per year.

The President has said recently:

"We estimate that for fiscal 1965 and beyond, the level of defense spending will remain constant -- or maybe even show a slight reduction if there is no significant change in the threat we face."





If the defense budget is stabilized at its present \$50 billion level, it will mean a reduction from last year's \$52.3 billion peak. The budget, shown in Table IV-5, is broken down into a number of major expenditure categories. Two of these, "Procurement" and "Research and Development Evaluation and Testing," represent most of the demand for output of defense industries. Together they account for roughly half of the total defense budget. The trend in these two items will predominate in determining the impact of budget changes on Massachusetts' defense industries.

Prior to the recently announced budget cuts, these two items were scheduled to fall by about \$2 billion or by almost 9 per cent from the previous year. A classification of the budget by major programs in Table IV-6 makes it clear that the planned reductions reflect to a considerable extent the gradual completion of the build-up of our strategic retaliatory forces.

It should be of some encouragement to the Massachusetts defense industry that research and development not specifically allocated to any specific program is being maintained at about its former level of about \$5 1/2 billion. This item includes primarily basic research and exploratory and developmental programs. Of possibly greater interest are amounts in the budget for "Space Research and Technology." This program, mainly under the National Aeronautics and Space Administration, was scheduled to expand substantially, as follows:



TABLE IV-5

U. S. BUDGET EXPENDITURES FOR NATIONAL DEFENSE  
(Millions of Dollars)

<u>Program or Agency</u>	<u>Fiscal Year</u> <u>1963</u> ( <u>Actual</u> )	<u>Fiscal Year</u> <u>1964</u> ( <u>Estimated</u> )	<u>Fiscal Year</u> <u>1965</u> ( <u>Estimated</u> )
Military Personnel	13,000	14,180	14,660
Operation and Maintenance	11,874	11,870	12,278
Procurement	16,632	16,337	14,785
Research and Development, Evaluation and Testing	6,376	6,943	6,580
Military Construction	1,144	1,104	1,056
Family Housing	427	680	660
Civil Defense	203	150	150
Military Assistance	1,721	1,400	1,200
Revolving and Management Funds	- <u>1,401</u>	- <u>367</u>	- <u>169</u>
Sub-Total: Department of Defense - Military	49,973	52,300	51,200
Atomic Energy	2,758	2,800	2,735
Other Defense-Related Activities Trust Funds and Intra- Government Transfers	<u>708</u>	<u>911</u>	<u>1,276</u>
TOTAL DEFENSE ACTIVITIES	53,429	56,011	55,211

Source: U. S. Budget Bureau, The Budget of the United States Government for the Fiscal Year Ending June 30, 1965.





TABLE IV-6

SUMMARY OF THE DEPARTMENT OF DEFENSE BUDGET PROGRAM  
(Billions of Dollars)

<u>Major Military Programs</u>	<u>Total Obligational Availability</u>		
	<u>Fiscal Year</u> <u>1963</u> (Actual)	<u>Fiscal Year</u> <u>1964</u> (Estimated)	<u>Fiscal Year</u> <u>1965</u> (Estimated)
Strategic Retaliatory Forces	8.4	7.3	5.3
Continental Air Missile Defense Forces	1.9	1.9	1.8
General Purpose Forces	17.9	18.2	18.5
Airlift and Sea Lift Forces	1.4	1.3	1.4
Reserve Forces	1.8	2.0	2.0
General Support	13.1	13.9	14.8
Retired Pay	1.0	1.2	1.4
Civil Defense	.1	.1	.4
Military Assistance	1.6	1.1	1.1
Proposed Legislation	--	--	.2
Research and Development, n.e.e.	<u>5.1</u>	<u>5.4</u>	<u>5.5</u>
TOTAL	52.2	52.5	52.4

Source: U. S. Bureau of the Budget, The Budget of the United States Government for the Fiscal Year Ending June 30, 1965.

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<u>Fiscal Year</u> <u>1963</u>	<u>Fiscal Year</u> <u>1964</u>	<u>Fiscal Year</u> <u>1965</u>
\$2,552 billion, actual	\$4,400 billion, estimated	\$4,992 billion estimated

In Massachusetts the effects of cutbacks within the defense budget have already been felt in some quarters and can be predicted in others. Plans for closing the Springfield Armory and the Watertown Arsenal over the next three or four years are, perhaps the most publicized aspects. Together they will represent a loss of about 4500 jobs by 1968. However, employment in the major defense industries in the state has already fallen by about 19,000 from the peak of two years ago. The figure was down by 8 per cent in September from a year ago, following a slightly larger decline from the year before. Ordnance has suffered most, with a drop of about 25 per cent from the peak in 1962. Employment in Transportation Equipment, which includes aircraft, on the other hand, picked up during the past year as indicated by Table IV-7. Table IV-7 also shows that the total decline in employment major defense industries and federal government defense employment has been about 22,000 since 1962.

Currently, awards of military prime contracts to Massachusetts are holding steady, as shown in Table IV-2, after dropping from the peak in 1962. Since then the fall in total awards for the U.S. has been negligible, but Massachusetts' share of the total has declined from 5.2 per cent to 4.2 per cent.

For the most part, the detailed data available are not sufficiently current to permit up-to-date analysis of trends with a high



TABLE IV-7

CHANGES IN EMPLOYMENT: MAJOR DEFENSE INDUSTRIES  
(Thousands of Workers)

	<u>September 19, 1962</u> <u>to</u> <u>September 19, 1963</u>	<u>September 19, 1963</u> <u>to</u> <u>September 19, 1964</u>	<u>Total:</u> <u>2 Years</u>
Ordnance	- 3.6	- 4.2	- 7.8
Communications Equipment	- 4.1	- 2.1	- 6.2
Electronic Components	- 2.8	- 1.0	- 3.8
Transportation Equipment	- 2.1	+ 0.9	- 1.2
Total Private	- 12.6	- 6.4	- 19.0
Federal Civilian (Defense Only)	--	--	- 2.8
Total, Including Government			- 21.8

Source: Private employment from Massachusetts Department of Labor and Industries, Division of Statistics; Government employment from the Boston Regional Office of the U. S. Bureau of Labor Statistics.





degree of reliability. However, the evidence which is available indicates that defense production is playing a substantially smaller role in the state economy than it did two years ago. If the military budget is to be kept down to its present level, Massachusetts must be prepared for demand from this source to supply a diminishing share of the aggregate demand for its labor force and industrial capacity.

#### Indirect Effects and Readjustment Problems

The direct effects of cutbacks in military expenditures are in their immediate impact on jobs and incomes. The indirect effects are those induced as the initial changes in turn affect demand for the output of other workers. The sum of these indirect effects may be quite substantial, but they are difficult to measure for particular states or regions. A previously cited study estimates that the additional indirect effects on employment and income of a cutback in defense expenditures would in total be equal to the direct effects.

A general reduction in defense expenditures, if not offset by growth in other types of demand, would have a severe impact on the national and state economy. This underlines the need for policies which are conducive to an expanding economy. Preliminary results of a recent study by the Harvard Economics Project show that the overall effect on regional employment would be negligible if cutbacks in military expenditures were exactly balanced by an increase in consumer expenditures. Even so, however, the sectoral composition of output and production would change substantially. In New England, the industries that would be destined to suffer most from the assumed shift



from defense to consumer purchases are:

- Aircraft and Other Transportation Equipment
- Ordnance
- Instruments
- Communication and Electronic Equipment
- Business Services

Those benefiting most would be:

- Trade
- Personal Repair Services
- Finance and Insurance
- Medical and Educational Services
- Transport
- Apparel
- Leather
- Fabrics and Yarn
- Food
- Livestock

The resources and skills required for production of electronic equipment are not readily adapted, for example, to producing clothing or catching fish. As Gardner Ackley, chairman of the President's Council of Economic Advisors, said recently in Boston, speaking of the decline already taking place in employment in certain defense industries,

"The resources released by this decline tend to be rather highly specialized, highly localized, and, in general, less easily transferred to satisfying other demands than has been the case in previous defense shifts. Moreover, the resources released include some of our key scientific and technical resources, and failure fully to utilize these resources would be particularly serious."

The problem of conversion from military to civilian production differs in a fundamental way from that faced after World War II. The task of firms at that time was to get back to the work they had been doing before the war, in other words, to reconvert. The bulk of





defense production today, on the other hand, is concentrated in firms and departments and even entire industries that came into existence mainly to meet defense needs. They have no background of production for civilian needs to which to return. Their problem is one of conversion to new lines of production. They must find or literally create new products that they are capable of producing profitably if they are to stay in business in the absence of government demand.

The policies which the federal government follows will play an important role in determining how the resources released from military production will find future employment. The Administration may choose to offset the declining amount of these purchases through reductions in taxes, through transfer payments to states, business or individuals, through increases in other federal expenditure programs, or by some combination of the three. Increasing investment in NASA programs, for example, would absorb far more readily the skilled manpower freed from defense production in Massachusetts than would the same expenditure on consumption items or, for that matter, than would expenditures on standard types of military procurement or personnel. The state economy has been facing major tasks of readjustment to the changing patterns of military expenditures in recent years, though there is some evidence that the worst may be nearly past. Readjustments are likely to continue to be necessary. The distribution of defense production in 1962 in Massachusetts was quite uneven, as shown in Table IV-8. The impact of defense cutbacks on particular communities will likewise vary substantially.



While the demands for action at the state level are likely to increase, compensating economic policy at this level is less effective than at the federal level. Still, the state should try to foresee the effect of cutbacks in military expenditures, both to formulate its position vis-a-vis the federal government and to take those steps which will facilitate the necessary adjustments. Technical education and retraining programs are among the activities which are available to the state to help displaced workers. It is appropriate to mention again at this point, however, that the state's tax structure, with its relatively heavy reliance on the property tax, aggravates rather than ameliorates the economic impact of such major changes as are occurring in the defense-related industries.



TABLE IV-8

DISTRIBUTION OF MILITARY PRODUCTION  
AMONG MASSACHUSETTS COUNTIES IN 1962

	<u>Amount</u> ( <u>Thousands</u> <u>of Dollars</u> )	<u>Per Cent</u>
Barnstable, Bristol, Dukes, Nantucket and Plymouth <sup>1</sup>	95,963	6.8
Berkshire, Franklin, Hampden and Hampshire <sup>1</sup>	212,830	15.2
Essex	379,226	27.0
Middlesex	377,271	26.7
Norfolk	142,256	10.1
Suffolk	60,882	4.3
Worcester	139,641	9.9

<sup>1</sup>Counties have been grouped to avoid disclosing operations of individual establishments.

Source: Massachusetts Department of Labor and Industries,  
Division of Statistics.



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123 456 789 1011 1213 1415 1617 1819 2021 2223 2425 2627 2829 3031 3233 3435 3637 3839 4041 4243 4445 4647 4849 5051 5253 5455 5657 5859 6061 6263 6465 6667 6869 7071 7273 7475 7677 7879 8081 8283 8485 8687 8889 9091 9293 9495 9697 9899 10000

## CHAPTER V

### MASSACHUSETTS' UNIONS, WORK STOPPAGES AND WAGE LEVELS

For those who see a vigorous and active labor movement as basic to improvements in working conditions and the level of living, the health of organized labor is an important issue. This Chapter will restrict itself to examining the growth of union relative wages, especially in highly unionized industries, and the degree of labor strife as measured by time lost due to strikes.

The labor situation in Massachusetts in 1964 appears generally sound. From the union standpoint its weakest aspect is a continuing decline in the number of union members. In large part this reflects employment declines in industries which have high concentrations of union members. However, there has been recent union growth in trade and government.

Despite a large union population, the state has an enviable record in the small percentage of working time lost due to work stoppages. In some measure this is traceable to a concentration of industries with low national strike rates but more important is the relatively low level of lost time among the same industries in Massachusetts compared to the levels of time lost in these industries in the nation as a whole. Lastly, wage levels in the state are modest and their rate of increase has been equally modest. Thus, it appears that Massachusetts enjoys an active union movement which does not appear to have contributed to an unstable work relationship, or one which has bought industrial peace at the price of excessive wages or wage changes.



## National Growth

The latter years of the decade of the 1950s and the early ones of the 1960s were not kind to organized labor. The number of union members in the United States has gone from a high point of around 17.4 million in 1956 to about 16.6 million in 1962, as shown in Table V-1. As a percentage of those employed in the non-agricultural sectors of the economy, this has meant a decline in the organization rate from 33 per cent in 1956 to 30 per cent in 1962.

In modern times unions have enjoyed their greatest success in such industries as mining, railroads, trucking, construction, and mass production industries like steel, rubber and automobiles. But in recent years, with the exception of construction, none of these sectors of the economy has achieved significant employment gains. This has tended to limit union growth. Since by 1956 these sectors were already highly organized, there were few opportunities for extension of union membership. This has meant that the most likely prospect for growth was by "new" organization in the underorganized sectors like wholesale and retail trade, services, and government. To date, gains in these sectors have been modest. The generally accepted reasons for the lack of clear-cut success are that these sectors are difficult to organize because of (1) the relatively small size of the typical employment unit, (2) the lack of legislation conducive to organization, especially as it relates to certain governmental and non-profit hospital employees, (3) the nature of the jobs and the outlook of the people who hold them, and (4) the high proportion of women with a short-term interest in the job employed in them.





TABLE V-1

UNION MEMBERSHIP IN THE UNITED STATES<sup>1</sup>

<u>Year</u>	<u>Union Members</u> <u>(Thousands)</u>	<u>Union Members</u> <u>as a Per Cent</u> <u>of Labor Force</u>	<u>Members as Per Cent</u> <u>of Non-Agricultural</u> <u>Employment</u>
1953	--	25.2	34.1
1954	--	25.1	35.1
1955	--	24.4	33.6
1956	17,490	24.8	33.4
1957	17,369	24.5	32.8
1958	17,029	23.9	33.1
1959	17,117	23.8	32.1
1960	17,049	23.3	31.4
1961	16,303	22.0	30.1
1962	16,586	22.0	29.7

<sup>1</sup>Before union growth can be measured, a determination must first be made of who is considered to be a union member. This may seem simple, a union member being one who belongs to a union; but what kind of union, and who determines whether a particular person is counted as a member? Both Massachusetts and Federal statistics on union membership are based upon written questionnaires sent to officials of labor unions, supplemented by other data where replies are not received. The United States Department of Labor survey includes all AFL-CIO affiliates and independents known to be interstate in character. In addition, an estimate is made of aggregate membership in single-firm and unaffiliated unions. For Massachusetts, the survey consists of "all local labor organizations known to be in existence as of January 15 of each year." In both cases, the figures on membership are those reported by the unions.

Approximately one-sixth of the national unions use their total per capita tax receipts from locals divided by the per capita tax rate as the estimate of their membership. Many unions, especially those who bargain in seasonal industries, will have a number of members for whom only partial per capita taxes are paid. Thus,



TABLE V-1 (Cont.)

many unions include in their estimates those who are (1) promoted out of the bargaining unit during the year, (2) unemployed or sick a portion of the year, (3) in military service, or (4) in locals whose financial status is such as to cause their per capita assessments to be lowered. This means that estimates of total union membership will vary somewhat with the concept of membership used by the reporting officers.

Source: 1955-1962, Directory of National and International Labor Unions in the United States, 1963, U. S. Department of Labor, Bureau of Labor Statistics, Bulletin No. 1395, May 1964.

(Includes all national and international unions, federal labor unions and local industrial unions directly affiliated with the AFL-CIO, single-firm and local non-affiliated unions; excludes Canadian members of unions with headquarters in the United States.)



## State Growth

In the Commonwealth the apparent high-water mark for unions came in 1953, three years before the national, as can be seen in Table V-2. In that year there were 614,385 union members in Massachusetts representing 33 per cent of non-agricultural employment. Since 1953 there has been an almost steady decline until in 1964 there were only 557,924 members or 28 per cent of the state's non-agricultural employment. From the foregoing, it is clear that Massachusetts is not a highly organized state, for its percentage of organized workers is less than the national average. Its relative position among the several states is even lower. In 1953, the year for which the best state estimates are available, Massachusetts' organizational rate of 33 per cent of non-agricultural employment ranked the state seventeenth among the 48 states. Despite this comparatively low ratio of union membership, Massachusetts ranked ninth in the number of union members. This placed her behind the states of New York, Pennsylvania, California, Illinois, Ohio, Michigan, New Jersey, and Indiana in that order. All of these states had significantly higher organizational rates, ranging from Michigan's high of 43 per cent to New York's low of 34 per cent. Thus, among the great industrial states, Massachusetts was less completely organized, though in its six-state region, it was the most highly organized.

Since 1956 national membership has declined 4.5 per cent. Because non-agricultural employment has been growing, this has meant a drop of 3.7 percentage points in membership as a proportion of non-agricultural





TABLE V-2

## UNION MEMBERSHIP IN MASSACHUSETTS

<u>Year</u>	<u>Union Members</u>	<u>Non-Agricultural Employment (Thousands)</u>	<u>Members as Per Cent of Non-Agricultural Employment</u>
1953	614,385	1,845.0	33.2
1954	589,083	1,791.9	32.8
1955	564,938	1,818.4	31.0
1956	574,096	1,865.6	30.7
1957	579,532	1,873.0	30.8
1958	559,446	1,828.2	30.6
1959	555,147	1,891.1	29.5
1960	558,600	1,916.7	29.2
1961	547,261	1,929.6	28.4
1962	574,296	1,958.0	29.2 (27.6) <sup>1</sup>
1963	563,624	1,955.9	28.6 (27.0) <sup>1</sup>
1964	557,924	--	--

<sup>1</sup>Based upon members less the 34,401 in the government unions added in 1962.

Source: Massachusetts Department of Labor and Industries, Directory of Labor Organizations in Massachusetts, 1954-1964, for membership figures. Employment is from U. S. Department of Labor, Bureau of Statistics, Employment and Earnings Statistics for States and Areas, 1939-1963, Bulletin No. 1370-1, 1964. Beginning in 1962, the figures include letter carriers and post office employees and certain employees of other government agencies. In 1962, membership was 34,401 for this group.



employment. In Massachusetts the actual loss in members has been 8.5 per cent. Reflecting the state's relatively low rate of employment growth (approximately one-half that of the national rate between 1956-1962) is the fact that with a greater decline in membership it experienced an equivalent loss in the percentage of its non-agricultural employees who are unionized.

On the basis of the best available data, the 525,000 members in 1962 in Massachusetts now qualify the state for seventh place in terms of most members. The state's rank in terms of percentage of non-agricultural employment, is a tie for ninth and tenth places.

#### Industrial Differences

An alternative way to compare Massachusetts with the rest of the nation is to look at the degree of union organization among various industries nationally and within the state.<sup>1</sup> Since Massachusetts is on the whole less well organized, it is to be expected either that most specific industries will show a similar relationship, or that the state's employment distribution is concentrated in sectors that are poorly organized. The state's industries can be divided into three groups, those in which Massachusetts is less well organized, approximately

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<sup>1</sup> Because of the differing definitions between the industrial groupings for union members taken from state records and the 1957 standard industrial classifications used for federal employment estimates the accuracy of the ratios in this section should be treated with caution. It is doubtful, however, if any basic trends are seriously misrepresented





equally organized or more highly organized. In the first category are contract construction with a local rate of 68 per cent and a national one of 83 per cent and wholesale and retail trade with a local rate of 7 per cent and a national one of 10 per cent. In the second group are textile mill products, apparel, and leather and leather products which together have a rate of organization of 50 per cent, and a national rate combined in a single group of 49 per cent. Printing and publishing is also in this group with a local rate of 40 per cent and a national one of 39 per cent. The major instance of higher relative organization is state and local government which is 24 per cent organized in Massachusetts, while all governmental employment, federal, state, and local, is only 13 per cent organized across the entire country.

### Intra-State Differences

While the overall record has been one of decline, some employment groups have recorded increases in membership and others, though failing to maintain membership, have fared fairly well in the face of major declines in employment (Tables V-3 and V-4. Two groups have run counter to the 11 per cent decline in state membership between 1954 and 1964.<sup>2</sup> These two are clerks in wholesale and retail trade with an increase of 39 per cent in membership and employees of municipal and state governments with a 46 per cent increase. At the opposite end of

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<sup>2</sup> The 11 per cent is obtained by subtracting the 1962 membership of the unions added to the state's count in 1962 from the 1964 membership figures. If this is not done, the decline is 5.2 per cent.



TABLE V-3

## UNION MEMBERS BY INDUSTRY IN MASSACHUSETTS

<u>Year</u>	<u>Boot and Shoe</u>	<u>Build- ing Trades</u>	<u>Clerks Wholesale and Retail</u>	<u>Clothing and Garment</u>	<u>Gas and Electric</u>	<u>Hotel &amp; Restau- rant</u>	<u>Metal &amp; Machin- ery</u>	<u>Munici- pal and State</u>
1954	26,312	51,770	19,789	37,774	10,939	10,121	123,469	33,870
1955	25,801	52,252	19,165	36,932	11,226	9,947	112,053	36,797
1956	25,024	51,735	19,012	36,752	12,298	9,880	118,718	39,436
1957	24,660	54,686	19,950	36,963	12,526	10,255	122,568	40,854
1958	22,873	57,322	22,462	36,839	12,978	9,608	114,855	41,209
1959	24,934	57,250	23,880	35,789	12,760	9,281	118,842	46,361
1960	23,960	54,389	24,190	40,237	12,728	9,246	117,405	44,086
1961	23,890	55,973	25,052	40,327	12,417	9,324	113,940	44,318
1962	24,065	56,940	27,084	41,106	12,499	9,030	107,800	45,462
1963	21,704	55,709	26,705	39,161	11,996	8,924	105,355	48,176
1964	20,171	55,817	27,498	39,073	11,912	8,438	96,915	48,943

<u>Year</u>	<u>Paper and Allied</u>	<u>Printing and Allied</u>	<u>Rubber</u>	<u>Teaming and Trucking</u>	<u>Tele- phone</u>	<u>Tex- tile</u>	<u>Rail- roads</u>	<u>Street Railways and Bus</u>
1954	12,473	14,560	17,810	34,965	18,160	46,206	22,458	11,769
1955	12,693	14,914	17,639	36,117	17,775	37,885	20,868	10,736
1956	13,753	15,416	18,335	36,654	19,505	35,178	20,665	8,807
1957	14,660	15,582	17,867	37,732	19,104	30,677	19,918	10,133
1958	15,114	15,286	15,278	35,537	19,194	25,788	17,991	10,089
1959	15,436	15,299	15,092	35,057	18,166	22,420	16,748	9,771
1960	15,316	15,600	16,030	35,278	15,435	22,311	14,743	9,880
1961	14,921	15,298	14,754	33,784	15,262	19,837	13,420	8,091
1962 <sup>1</sup>	14,793	15,748	15,614	33,595	15,814	18,907	12,118	7,817
1963	14,624	16,013	14,864	33,636	15,249	17,331	11,380	7,467
1964	14,389	15,908	12,970	34,685	15,115	15,339	10,908	8,818

<u>Year</u>	<u>All Other</u>
1954	96,617
1955	92,138
1956	92,880
1957	91,397
1958	87,023
1959	88,061
1960	86,766
1961	86,625
1962	115,954
1963	115,330
1964	121,025

<sup>1</sup>Beginning in 1962, letter carriers and certain other governmental employees are included. They all appear in the "All Other" category.

Source: Directory of Labor Organizations in Massachusetts, 1954-1964.





TABLE V-4

RATES OF GROWTH IN UNION MEMBERSHIP AND EMPLOYMENT  
IN MASSACHUSETTS

	<u>Percentage Growth in Union Membership 1954-1963</u>	<u>Percentage Growth in Employment 1954-1963</u>
Massachusetts <sup>1</sup>	- 4.0 (- 10.0)	+ 9.0
Boston	+ 1.5	+ 11.0
Brockton	- 13.0	--
Fall River	- 15.5	--
Lawrence-Haverhill	- 17.0	--
Lowell	- 29.5	--
New Bedford	+ 1.0	- 0.5
Pittsfield	- 18.0	--
Springfield	- 10.5	+ 4.0
Worcester	- 8.0	+ 3.0
All Others	- 4.5	--
✓ Boot and Shoe Industry	- 17.5	--
Footwear Less Rubber	--	- 15.0
Building Trades	+ 8.0	--
Contract Construction	--	+ 15.0
Clerks, Wholesale and Retail	+ 35.0	--
Wholesale and Retail Trade	--	+ 12.0
✓ Clothing and Garment Trades	+ 4.0	--
Apparel	--	- 2.0
<del>Teamsters</del> Gas and Electric Workers	+ 9.0	--
Telephone Operators and Workers	- 16.0	--
Railroads	- 49.5	--
Street Railroads and Passenger Bus Companies	- 36.5	--
Transportation and Utilities	--	- 12.5
Hotel and Restaurant Workers	- 12.0	--
Municipal and State Employees	+ 44.0	--
Government	--	+ 14.0
✓ Paper and Allied Industries	+ 17.0	+ 3.0
Textile Industries	- 62.5	--
Textile Mill Products	--	- 39.5
Printing and Allied Trades	+ 10.0	+ 10.0
Rubber Workers	- 16.5	--
Rubber and Plastics	--	+ 14.0
Metal and Machinery Trades	- 14.5	--
Fabricated Metal	--	- 3.0
Primary Metal	--	- 7.0
Machinery	--	+ 3.5
Electrical Machinery	--	+ 10.0
Transportation Equipment	--	- 17.5
Instruments	--	+ 22.0





TABLE V-4 (Cont.)

The rate for Massachusetts includes the federal employees included in 1962 and is comparable to the rates for the metropolitan areas. The rate in parentheses excludes the federal employees and is comparable to the rate for the industries.

Source: Figures for union membership are based upon data in Tables V-2 and V-3. Employment rates are calculated from U. S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings Statistics for States and Areas.



the distribution are railroads where the loss in membership was 52 per cent and textile mill products with a decline of 67 per cent. More important than the absolute gains or declines in membership is the degree to which unions have maintained themselves relative to their potential for membership in the various industries, defined here simply in terms of employment totals for broadly defined groups. Not surprisingly, the wholesale and retail clerks have the best record. For the years 1954-1963 employment in wholesale and retail trade grew by 12 per cent while unionism among clerks in this industry rose by 35 per cent. The experience of state and local government employees is also favorable. The increase in union members was 44 per cent while total government (federal, state, and local) employment grew by 14 per cent. For the last five years (1958-1963) when the employment growth of federal employees can be separated from that of state and local employees, the picture is less encouraging to unions, for membership grew by 17 per cent compared to an employment growth of 15 per cent. Unions also grew reasonably well among paper and allied products employees, while in the clothing and garment trades, a small gain in membership occurred despite a modest decline in employment.

A second group is comprised of employees in gas and electric utilities, building trades, and printing and allied products. Their union membership grew about 10 per cent, but employment growth matched or exceeded that rate. The third group consists of areas where there was a relative loss of union membership arising chiefly from an absolute loss in membership which exceeded the decline in employment. Here we find boot and shoe workers with a drop of 18 per cent in membership coupled with a drop of 15 per cent in employment. All of the separate union groups in transportation and public utilities (gas and electric workers,





teamsters and trucking, telephone operators, railroads, and street railway employees) had a combined loss of membership of 19 per cent while the state experienced a 13 per cent loss in employment in this sector. Rubber workers had a decline in membership of 17 per cent, while employment in rubber and plastics rose by 14 per cent. Unionism in textiles, which by 1963 had lost 63 per cent of every 100 members in 1954, is in an industry that lost 40 per cent of every 100 jobs during the same nine years. The biggest apparent weakness, and an important one because of the large number of workers involved, is in metals and machinery. In 1954, 21 per cent of all union members were in this industrial category. Between 1954 and 1963 membership dropped by 15 per cent. (The number would be 22 per cent if 1964 rather than 1963 were used as a base year.) In the industrial groups where these people find employment, transportation equipment, fabricated metals, and primary metals have declined in employment, while machinery and electrical machinery have grown. And two of the declines in employment have been modest.

Massachusetts is a state with a large number of union members, but with a percentage of total non-agricultural employment unionized that places her well down the list of highly unionized states. In recent years the state's declines in union membership have exceeded the national average, but her relatively slow rate of growth in employment has preserved her organizational percentage relative to the national average. Massachusetts is poorly organized when compared to the other great industrial states, but highly organized when compared to her immediate neighbors. The bright spot for unions in Massachusetts has been the relative gains in membership among trade and governmental employees. The question would



be whether these growth rates can continue fast enough to offset the apparent employment and union weaknesses in other sectors of the economy.

### Work Stoppages

The relationship between an employer and his employees, whether unionized or not, is a complex pattern of numerous dimensions. A strike is only one of these aspects. The rate of employee turnover, the quality of work habits, and morale, all are important. Even though work stoppages are not the sole determinant of the "quality" of a firm's labor relations or of the labor climate of a city or state, they are an important factor and the most visible and easily measured of the several characteristics. Also, it is to be expected that in situations with good labor relations and a "good" labor climate, labor disputes would be at a minimum.

### A Proper Measure

If Massachusetts' labor climate is to be evaluated, at least partly, in terms of work stoppages, which of the several dimensions of work stoppages should be used? Should it be the number of workers involved, the average duration, or the percentage of total working time lost? The method most often used is the percentage of man-days lost. Whether it is the appropriate one depends upon what one is trying to gauge. An employer thinking of locating his plant in an area is apt to be most interested in the probability of a strike and of its possible length. This would seem to call for some measure like the number of strikes divided by the number of collective agreements





reached, data not easily available. Even if such data were available, they would have to be adjusted to account for geographical and industrial differences within the state. In addition, national contract decisions may not have much of an impact on a state's labor climate but may still occasionally result in large numbers of man-hours being lost. Nor is the relative size of the industry the only factor. The shipbuilding industry in Massachusetts is geographically localized and involves somewhat specialized skills. Therefore work stoppages in shipbuilding would probably be much less important in setting the tone of the state's labor climate than would stoppages in the electronics industry which is widely dispersed throughout the state and involves more easily transferable skills.

#### Massachusetts and the U.S.

Recognizing that percentage of working time lost due to work stoppages is, at best, only a partial measure of the state's labor climate, one may still use it to make some meaningful inter-state comparisons. By any available measure there is much less labor strife in Massachusetts (Table V-5) than in the United States as a whole. In the past twelve years, the estimated working time lost per worker in Massachusetts has exceeded the national average in only two years, 1960 and 1955. In 1955 the difference was fairly small, 0.31 per cent for Massachusetts compared to a national average of 0.26 per cent. In 1960 the Massachusetts rate was over twice that of the United States. For the past twelve years, 0.26 per cent of working time per year has been lost in the U.S. compared to only 0.18 per cent per year for





TABLE V-5

WORKING TIME LOST DUE TO WORK STOPPAGES  
IN THE UNITED STATES AND SELECTED STATES

Per Cent of Working Time Lost

<u>Year</u>	<u>U.S.</u>	<u>Mass.</u>	<u>N.Y.</u>	<u>Calif.</u>	<u>Pa.</u>	<u>Ill.</u>	<u>Ohio</u>	<u>Mich.</u>	<u>N.J.</u>	<u>Ind.</u>
1952	.57	.21	.32	.56	1.36	.57	1.07	.67	.35	1.15
1953	.26	.15	.23	.35	.35	.18	.34	.43	.30	.47
1954	.21	.09	.15	.13	.37	.10	.27	.20	.20	.18
1955	.26	.31	.18	.21	.40	.19	.37	.31	.35	.36
1956	.29	.20	.22	.13	.87	.22	.66	.22	.29	.65
1957	.14	.14	.12	.16	.16	.14	.22	.24	.21	.11
1958	.22	.13	.18	.12	.22	.23	.48	.72	.22	.30
1959	.61	.21	.33	.34	1.82	.57	1.40	.53	.44	1.83
1960	.17	.40	.20	.08	.25	.10	.13	.14	.17	.22
1961	.14	.10	.14	.11	.21	.11	.21	.38	.17	.17
1962	.16	.10	.18	.25	.17	.13	.16	.28	.14	.26
1963	.13	.12	.19	.12	.16	.11	.12	.12	.13	.16
Average	.26	.18	.20	.21	.42	.22	.45	.35	.25	.49

Per Cent of Working Time Lost

<u>Year</u>	<u>Mo.</u>	<u>Minn.</u>	<u>Ore.</u>	<u>Wash.</u>	<u>Mont.</u>	<u>W.Va.</u>	<u>Wisc.</u>	<u>Me.</u>	<u>N.H.</u>	<u>Vt.</u>	<u>Conn.</u>	<u>R.I.</u>
1952	.37	.57	.49	.57	.09	1.38	.39	.02	.11	.53	.48	.16
1953	.42	.15	.13	.38	.30	.30	.31	.05	.05	.24	.25	.19
1954	.30	.17	1.87	1.44	1.35	.26	.27	.07	.07	.30	.23	.09
1955	.30	.17	.19	.08	.07	.30	.34	.47	.06	.15	.28	.39
1956	.15	.32	.06	.12	.06	.54	.21	.02	.01	.04	.26	.05
1957	.30	.08	.09	.24	.06	.34	.11	.08	.04	.02	.08	.19
1958	.24	.11	.77	.43	.13	.23	.15	.05	.16	.03	.10	.08
1959	.32	.94	.22	.55	2.47	.91	.27	.02	.03	.10	.18	.18
1960	.41	.17	.11	.10	.53	.10	.15	.03	.01	.07	.53	.06
1961	.16	.22	.22	.15	.12	.21	.11	.01	.01	.15	.13	.03
1962	.12	.12	.16	.42	.53	.21	.11	.02	.04	.38	.21	.07
1963	.22	.04	.46	.32	.20	.18	.13	.03	.07	.02	.13	.10
Average	.28	.25	.39	.40	.49	.41	.21	.07	.06	.17	.24	.13

Source: For 1952-1962, Work Stoppages, Fifty States and District of Columbia, 1927-1962, Bureau of Labor Statistics' Report No. 255, October 1963.

For 1963, Monthly Labor Review, Vol. 87 (July 1964).



Massachusetts. Actually the state's record looks even better if it is compared with other states with larger numbers of union members.

These would be California, Illinois, Indiana, Michigan, New Jersey, New York, Ohio, and Pennsylvania. For the years for which data are available, 1952-1963, none of these states have as good an over-all record as that of Massachusetts. Only in 1960, Massachusetts' worst year, did all of these states have better records, though some of them did better in one or two other years. In terms of twelve-year averages, the states which comes closest to Massachusetts' rate of 0.18 per cent per year are New York with an average of 0.20 per cent and California with an average of 0.21. California has had a lower rate than Massachusetts in four of the twelve years and in 1963 the rates were the same. New York also has the distinction that her worst year is not as bad as Massachusetts' 1960 rate, but the worst years of the other states exceed that of Massachusetts in 1960.

Two other comparisons can be made. One is with states which rank high in terms of union members as a percentage of the non-agricultural labor force. Here too, Massachusetts does very well. In addition to the states already mentioned, Minnesota, Missouri, Montana, Oregon, Washington, West Virginia, and Wisconsin made up the fifteen states with the highest percentage of union members in 1953. None of these additional states have average percentages of working time lost which come close to that of Massachusetts. Two of them, Minnesota and Oregon, have better records in five of the twelve years, but their overall averages of 0.25 and 0.39 are considerably worse. The other comparison is with geographical sister states. Here, the record, not surprisingly, is not as favorable. Rhode Island, Maine, New Hampshire and Vermont have lower rates of average time lost although the





Vermont rate is only slightly lower. Connecticut and, as has been noted, New York have higher ones.

#### Massachusetts Labor Peace

The excellent record which has been achieved in Massachusetts in the low percentage of working time lost due to work stoppages could be the product either of favorable industrial distribution or of a low incidence of strikes in most sectors. As can be seen in Table V-6, for major non-agricultural employment sectors, Massachusetts' industrial distribution is roughly similar to that of the United States generally. Even within the manufacturing sector, there are only a few pronounced differences. Thus, it is unlikely that a high concentration of poorly unionized or of low strike-conscious industries will explain the state's record. While it is true that some of the industrial differences, like the relatively large leather industry in the Commonwealth, may contribute to the low record because of few strikes, it is equally true that the size of the machinery industry should have increased labor strikes for nationally during the last five years this industry has experienced a high lost-time rate.

Of greater importance is the relatively modest work stoppage experience of Massachusetts industries when compared to their national counterparts. As can be seen in Table V-7, all state industries except six, Transportation and Communication, Ordnance, Textile Mill Products, Apparel, Transportation Equipment, and Professional and Scientific, have lower average rates of man-days lost due to work



TABLE V-6

## INDUSTRIAL DISTRIBUTION OF EMPLOYMENT

1 9 6 2

<u>Industry</u>	<u>Per Cent of</u>	<u>Per Cent of</u>	<u>Excess (+)</u> <u>or Deficiency (-)</u>
	<u>Employment</u> <u>U. S.</u>	<u>Employment</u> <u>Massachusetts</u>	<u>of Massachusetts</u> <u>Per Cent</u>
Non-Agricultural Employment	100.0	100.0	
Mining	1.2	--	- 1.2
Contract Construction	5.2	4.0	- 1.2
Transportation and Com- munication	7.0	5.3	- 1.7
Wholesale and Retail Trade	20.8	20.3	- 0.5
Finance, Insurance and Real Estate	5.0	5.3	+ 0.3
Services	14.2	16.6	+ 2.4
Government	16.4	13.4	- 3.0
Manufacturing	30.2	35.2	+ 5.0
Ordnance	1.6	3.4	+ 1.8
Food	10.4	6.4	- 4.0
Tobacco	0.5	--	- 0.5
Textile Mill Products	5.4	6.6	+ 1.2
Apparel	7.5	8.6	+ 1.1
Lumber and Wood Products	3.5	0.8	- 2.7
Furniture and Fixtures	2.3	1.8	- 0.5
Paper and Allied Products	3.6	5.3	+ 1.7
Printing and Publishing	5.5	5.8	+ 0.3
Chemicals & Allied Products	5.0	2.8	- 2.2
Petroleum Refining	1.2	--	- 1.2
Rubber	2.4	5.4	+ 3.0
Leather & Leather Products	2.2	7.9	+ 5.7
Stone, Clay and Glass	3.5	1.5	- 2.0
Primary Metals	6.9	3.3	- 3.6
Fabricated Metal Products	6.7	5.8	- 0.9
Machinery	8.8	10.1	+ 1.3
Electrical Machinery	9.4	14.0	+ 4.6
Transportation Equipment	9.2	3.3	- 5.9
Professional & Scientific	2.1	3.7	+ 1.6
Miscellaneous Manufacturing	2.3	--	- 2.3

Source: Calculated from employment data in Employment and Earnings Statistics for States and Areas, 1939-1963 for Massachusetts and Monthly Labor Review, July 1964, for the United States.





TABLE V-7

## UNITED STATES AND MASSACHUSETTS STRIKE EXPERIENCE, 1958-1962

<u>Industry</u>	<u>Average</u>	<u>Average</u>	<u>No. of Years</u> <u>Mass. Rate</u> <u>Less U.S. Rate</u>
	<u>Man-Days Lost</u> <u>Per Employee</u> <u>United States</u>	<u>Man-Days Lost</u> <u>Per Employee</u> <u>Massachusetts</u>	
Non-Agricultural Employment	.55	.42	4
Mining	2.21	--	-
Contract Construction	1.47	1.09	4
Transportation and Com- munication	.51	.63	3
Wholesale and Retail Trade	.08	.03	5
Finance, Insurance and Real Estate	.00	.00	4
Services	.03	.03	4
Government	.01	.01	3
Manufacturing	1.23	.89	4
Ordnance	.60	.70	4
Food	.48	.31	4
Tobacco	.09	--	-
Textile Mill Products	.11	.20	2
Apparel	.30	.38	2
Lumber and Wood Products	.42	.37	3
Furniture and Fixtures	.75	.24	5
Paper and Allied Products	.53	.21	5
Printing and Publishing	.37	.37	2
Chemicals & Allied Products	.55	.10	5
Petroleum Refining	2.34	--	-
Rubber	1.45	.84	4
Leather & Leather Products	.18	.16	2
Stone, Clay and Glass	1.17	.51	4
Primary Metals	7.29	2.85	4
Fabricated Metal Products	1.02	.51	5
Machinery	1.02	.94	3
Electrical Machinery	.63	.39	4
Transportation Equipment	1.67	10.93 <sup>1</sup>	3
Professional and Scientific	.52	1.74	1
Miscellaneous Manufacturing	.36	--	-

<sup>1</sup>In 1960, the loss was 52 days per employee, which explains its high value and also much of the State's high value of working time lost in 1960.

Source: Strike loss data are from Analysis of Work Stoppages During 1958, . . . , 1962, U. S. Department of Labor, Bureau of Labor Statistics, Bulletin 1258, 1259, 1302, 1339 and 1381. Employment data are from Employment and Earnings Statistics for States and Areas, 1939-1963, and Employment and Earnings, September 1963





stoppages per employee<sup>3</sup> than those for the whole country. The same table indicates that the source of this record is the fact that the majority of the industries have Massachusetts loss rates which are lower than the national ones in four or five of the last five years. Also contributing is the fact that many of the state's industries which have poor records relative to the national ones are industries like apparel, textiles, and leather, which generally have low absolute strike losses.

Massachusetts' record of work stoppages is quite low when judged by either reasonable standard, national experience or other highly unionized or industrialized states. Its twelve-year average of 0.19 per cent of working time is one-fourth lower than the national one. The best that any other industrialized state has done is still 5 per cent higher than the Massachusetts rate. In some small part this is probably due to the industrial distribution of its employment. The major factor, however, is the low strike activity record of the majority of the state's industries, both absolutely and relatively. Only six industries have higher rates in Massachusetts than they do nationally. A detailed study would be needed to determine reasons for Massachusetts' relatively low work-stoppage rates. However, the credit for the situation is shared by management, labor, and professional mediators and arbitrators for their respective roles in minimizing stoppages.

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<sup>3</sup> This relationship is reported for the years 1849-1949 in George H. Borts and Jerome L. Stein, Economic Growth in a Free Market, New York: Columbia University Press, 1964, p. 41.



## Relative Wages

In recent years states have vied to obtain new private and federally aided industries and firms. In the process they have become increasingly aware of their own comparative advantages. One aspect of comparative advantage is labor costs. Included in these costs are the impacts of wages, the quality of labor, productivity, work standards, morale, turnover, etc. Ideally all of these aspects of the labor situation should be discussed here. Most of them, however, are not clearly defined in terms of identifiable variables, and, more practically, extensive data on them are not available. Consequently, this section deals only with average wages in Massachusetts, the national economy and selected other states.

It is relatively simple to establish that average hourly earnings are higher in one state than in another. To obtain a proper understanding of the significance of that relationship is more difficult. If labor productivity is also higher in the high-earnings state, then labor costs may be equal between the two states or even lower in the high-wage state. In addition, since a determination of average earnings involves a weighting of wages for various skills within an industry or state, it is possible for two localities to have equal wage rates for all occupations, but for them to have quite different average wages because of varying proportions of different occupations and skills. Similarly, wages in sub-sectors of broadly defined industries have different averages. The 1963 national average hourly wage for production workers in the food industry was \$2.31. In the





beverages sub-sector it was \$2.64 an hour and in confectionery it was \$1.98 an hour. Therefore, a state's average earnings in the food industry will depend, in part, on whether it has a large concentration of confectionery or of beverages.

#### Massachusetts and Other Areas

Massachusetts is in many ways a relatively low-wage state. Its average hourly wage in 1963 for manufacturing production workers was \$2.29. This was \$.17 below the national average and \$.18 below the median wage for the 48 states. This placed Massachusetts 31st among the 48 states. Compared to the nine other states with large union membership (Table V-8), Massachusetts is seventh in rank and \$.19 below the lowest one, Pennsylvania. Among our neighboring states, the pattern is reversed and Massachusetts is a high-wage area. The state average of \$2.29 exceeds that of Maine, Vermont, New Hampshire, and Rhode Island by \$.25 to \$.36. Only Connecticut of the New England states has higher average earnings. The national average of \$2.46 an hour is composed of an average of \$2.63 per hour in durable goods manufacturing and \$2.22 an hour in non-durable goods. Within Massachusetts, average earnings in durables exceed those in non-durables, but relatively the difference is not so great, for, while the state average for durables is 7 per cent below the national average, for non-durables it is only 3 per cent below.

Among the several industries there is a similar pattern (Table V-9). In textile mill products, leather and leather goods, and stone clay and glass, this is a high-wage state, for the average earnings here are about 10 per cent above the national averages. Lumber and wood products, furniture and fixtures, food, apparel, and chemicals



TABLE V-8

## AVERAGE WAGE AND EMPLOYMENT CHANGES FOR SELECTED STATES

<u>State</u>	<u>1963<sup>1</sup></u>		<u>Change in</u>		<u>Change in</u>	
	<u>Average</u>	<u>Wage<sup>2</sup></u>	<u>Wages</u>	<u>Change<sup>3</sup></u>	<u>Non-Agricultural</u>	<u>Change<sup>4</sup></u>
	<u>Wage</u>	<u>Rank</u>	<u>1953-1963</u>	<u>Wages</u>	<u>Employment</u>	<u>Emp.</u>
			<u>(Per Cent)</u>	<u>Rank</u>	<u>1954-1963</u>	<u>Rank</u>
					<u>(Per Cent)</u>	
New York	2.52	22.0	37	31.50	8	39.5
Pennsylvania	2.48	23.5	38	26.0	0	47.0
California	2.38	3.0	41	18.50	40	5.0
Illinois	2.57	12.0	40	23.0	8	39.5
Ohio	2.83	5.0	42	14.0	4	42.0
Michigan	3.02	2.0	40	23.0	3	44.0
New Jersey	2.59	16.0	38	26.0	16	23.0
Indiana	2.73	6.0	41	18.5	14	30.0
Massachusetts	2.29	31.0	37	31.5	9	37.0
Missouri	2.46	25.0	42	14.0	10	36.0
Texas	2.35	29.0	31	42.0	22	15.0
Maine	1.95	42.0	37	31.5	3	44.0
Vermont	2.02	39.0	37	31.5	8	39.5
New Hampshire	1.93	43.0	34	39.0	16	23.0
Rhode Island	2.04	33.0	33	41.0	2	46.0
Connecticut	2.54	21.0	40	23.0	12	33.5
State Median	2.47	--	40	--	16	--

<sup>1</sup>Wage is for production workers in manufacturing.

<sup>2</sup>Nevada with an average of \$3.11 an hour is first. North Carolina with an average of \$1.63 is 46th.

<sup>3</sup>Louisiana and Florida with 51 per cent increases were tied for first. Oregon with 26 per cent was 47th. Data on North Dakota were unavailable.

<sup>4</sup>Nevada with 86 per cent was first. West Virginia with minus 6 per cent was 48th.

Source: Employment and Earnings Statistics for States and Areas, 1933-1963.





TABLE V-9

## UNITED STATES AND MASSACHUSETTS AVERAGE WAGES BY INDUSTRY

<u>Industry</u>	<u>1963 Production</u>	<u>1963 Production</u>	<u>Ratio</u>
	<u>Worker Average</u> <u>Hourly Wage</u> <u>United States</u>	<u>Worker Average</u> <u>Hourly Wage</u> <u>Massachusetts</u>	
Manufacturing	\$2.46	\$2.29	.93
Durable Goods	2.63	2.48	.95
Non-Durable Goods	2.22	2.15	.97
Ordnance and Accessories	2.91	2.51	.87
Lumber and Wood Products	2.04	2.11	1.04
Furniture and Fixtures	1.99	2.05	1.03
Stone, Clay and Glass	2.48	2.78	1.12
Primary Metal Industries	3.04	2.63	.87
Fabricated Metal Products	2.61	2.35	.90
Machinery	2.78	2.57	.96
Electrical Equipment	2.46	2.31	.94
Transportation Equipment	3.01	3.08	1.02
Instruments and Related Products	2.49	2.31	.93
Food and Kindred Products	2.31	2.25	.98
Textile Mill Products	1.71	1.83	1.10
Apparel and Related Products	1.72	1.77	1.03
Paper and Allied Products	2.48	2.30	.93
Printing and Publishing	2.88	2.80	.97
Chemicals & Allied Products	2.72	2.70	.99
Rubber and Plastics	2.47	2.33	.95
Leather and Leather Products	1.75	1.98	1.13

Source: The U. S. averages are from the Monthly Labor Review, July 1964. The Massachusetts averages are from Employment and Earnings Statistics for States and Areas, 1939-1963.





form a second group. In these the state wage levels are essentially equal to the national one, being just a little above or below it. The remainder of the industries are the relatively low-wage ones with average earnings 4 to 13 per cent below the respective national average. The specific industries which comprise these three groups suggest that the principal reason for the state's low-wage position lies in the types of industries. Of the eight manufacturing industries whose ratio of state to national average wage is from .98 to 1.12, six of them have absolute wage levels below both the Massachusetts and the national average.

The movement of wages over-time is suggested by the behavior of average hourly earnings although changes in the latter do not provide a completely accurate measure. Changes in average hourly earnings for production workers will reflect both actual increases in wage rates as well as shifts in employment among industries with differing wage levels and even employment shifts within an industry. The range of increase in average hourly wages from 1958 through 1963 for the 48 states is from 26 per cent to 51 per cent, with a median of 40 per cent. Massachusetts falls below the median with an increase of only 37 per cent, a rate that tied with that for New York for the lowest rate among the nine other highly industrialized and unionized states. In this case, Massachusetts is much closer to her geographical sister with only Rhode Island and New Hampshire having lower rates of increase.

Since the state's wage level and its rate of change are both modest in comparison with the national level and with those of other industrialized states, one expectation might be that Massachusetts'



growth in employment would have at least equaled that of other states. Such an expectation cannot be directly tested, for industrial location and expansion depend upon a number of other factors besides wages and labor costs. Consequently, it is difficult to assess the importance of wage levels in contributing to the state's low growth in employment. Between 1954 and 1963 non-agricultural employment grew by 9 per cent. This was somewhat below the national average of 11 per cent, but significantly below the median rate of 16 per cent for forty-eight states. The Massachusetts record compares somewhat more favorably with those of the nine other industrialized states, being exceeded only by New Jersey, Indiana and, of course, California. In New England both Connecticut and New Hampshire experienced more rapid growth.

Massachusetts has relatively modest wage levels. This is primarily due to its having lower than national averages in many high-wage industries and extensive employment in industries with low-wage levels, even though the state's average wages exceed national ones in many of these latter industries. Wage changes since 1958 have been somewhat slower than for the nation as a whole, as has employment growth. In the case of the latter, this appears to be the continuation of a trend almost a century old.

The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present. The author then proceeds to discuss the various factors that have shaped the development of the United States, including the role of the government, the influence of the economy, and the impact of the culture. The paper concludes by emphasizing the need for a continued study of the history of the United States in order to ensure a bright future for the nation.

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## CHAPTER VI

### NATURAL RESOURCES

This chapter is concerned with: (1) resources as they create environment; (2) water, a most versatile resource with many different end uses; (3) energy resources, which vary over a wide spectrum in physical and technical properties but all go to satisfy similar demands. The next chapter is concerned with specific uses of particular resources: agriculture, forestry, and fisheries.

#### Environmental Resources

Massachusetts is densely-populated; it has more inhabitants per square mile than any political subdivision of the United States except the District of Columbia, Rhode Island, and New Jersey. Connecticut, its other southern neighbor, stands fourth in population density. Much of Massachusetts is also included in the heavily populated area called "Megalopolis" which stretches from the northern suburbs of Boston to the southern suburbs of Washington, D. C..

This combination of dense population and proximity to other population centers creates unusual opportunities for recreation and tourism. These opportunities are enhanced by the variety and quality of the scenery, and the historical and recreational attractions of the state. At the same time, there is an obvious danger that some of the environmental advantages of Massachusetts may be neutralized by congestion and urban sprawl.

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course, a very old one by American standards. In addition, Massachusetts' agriculture never recovered from the Midwestern competition which began to make itself felt with the opening of the Erie Canal. As a result, the pre-automobile distribution of population in Massachusetts was very uneven. The Boston metropolitan area, the Merrimac Valley, the Fall River-New Bedford area, Worcester, and the Connecticut Valley have been densely-populated for a century or more. The outlying reaches of many towns were less populous in 1920 than in 1820. This abrupt alternation between urban congestion and rural emptiness created unusual opportunities for the reservation of open space and the systematic development of facilities for recreation. But, until the recent appearance of the super-highway, these opportunities were being gradually frittered away through random commercialization and residential invasion of the countryside. The automobile means mobility; and mobility, in such close quarters as those prevailing in Massachusetts, offers a threat as well as a promise.

Tourism. One of the most important aspects of the automobile, from the commercial standpoint, is its expanding contribution to the development of tourism. Unfortunately, data on tourism in Massachusetts are exceptionally hard to obtain. This is especially true of data on out-of-state visitors. If tourism is hard to measure from the side of demand, the problem is not simplified by shifting attention to supply. The tourist "industry" involves no single products, processes, raw materials, or labor skills which can be isolated as a prelude to statistical interpretation. As an in-





dictation of the scope of the industry the following may be noted. About 4500 year-round restaurants submit meal tax returns to the Massachusetts Department of Taxation. Another thousand restaurants are open for business only during the traditional vacation and travel season. If each of these restaurants hired but five people, these extra restaurants alone would account for seasonal employment of 5000 workers--a number equal to more than half the seasonal employment in Massachusetts agriculture. This employment is, of course, in addition to net extra employment and income in year-round establishments.

In sum, tourism is important to Massachusetts even if its extent cannot be readily determined. It may involve a gross of \$400 million, or even more per year--as compared with such magnitudes as \$150-\$160 million from cash farm marketings in Massachusetts, and just over \$40 million from fish landed at Massachusetts ports. On the average, perhaps 70 per cent of the users of Massachusetts vacation facilities come from outside the state. However, the Massachusetts share of U. S. vacation expenditures is believed not to exceed one per cent of the total, and is almost certainly well below the Massachusetts share of the U. S. population or personal income.

The prime consideration for tourism must, of course, be the provision of something worth making the effort to visit. But this, in turn, involves publicity as well as the creation of an appropriate "product". As Table VI-1 indicates, Massachusetts is markedly deficient in making its attractions known.

Actually the Massachusetts tourist promotion expenditure is less than the excess of meal tax receipts of a single summer month over the annual average.



TABLE VI-1

STATE GOVERNMENT EXPENDITURES  
FOR PROMOTION OF VACATION AND TOURIST TRAVEL  
1963-1964 - SELECTED REPRESENTATIVE STATES

State	<u>Dollar</u> <u>Expenditures</u>	<u>Per Capita</u> <u>Expenditures</u> (Cents)
Massachusetts	\$ 100,000	2¢
Vermont	177,500	45
Maine	430,000	44
New Hampshire	275,000	44
Rhode Island	112,000	13
South Dakota	411,000	60
Florida	1,650,000	30
Kentucky	706,000	23
Alabama	650,000	19
Virginia	605,000	15
Pennsylvania	927,000	8

Source: Curtis Publishing Company Annual Survey of State, Area and Community Advertising and Promotional Expenditures, 1963-1964.

Population data: 1960 U. S. Census.





The question of the values of the tourism "product" itself merges into the attractiveness of Massachusetts as a state for year-round residence. As industrialization and economic activity in general become steadily less tied to sources of raw material and fuel, and more drawn to sites which offer attractive living conditions for executives and other personnel within daily commuting distances, the advantages of attracting visitors for the summer only may fade before the superior advantages of attracting them as permanent residents.

Some features of the Massachusetts environment can well serve the dual purpose of attracting both new tourists and new industries. For example, Massachusetts contains over one-third of the historic shrines in the country. It offers 35 state parks and 40 state forests, spread over a total area of land equal to almost the entire urbanized acreage in the state. Summer theaters, music festivals, and artist colonies supplement the educational institutions for which the state is famous. Even in climate, the state can offer a variety from open winters on Cape Cod to a long skiing season in the Berkshires.

In meeting the new problems of land use posed by population growth, higher incomes, shorter hours of work, a steady rise in the number of automobiles, and the other influences making for greater mobility, the present extent of government powers and programs may not be adequate. Zoning regulations in one town are likely to affect its neighbors. Serious and effective attempts at tourist promotion, or attraction of industries on the basis of special attributes of scenery or other amenities, may often be beyond the financial or



geographical powers of one town but well within the control of an area or of the state as a whole. Specific recommendations here have to await further study of the nature of demand for land as an environment or as a factor in recreation and tourism.

Meanwhile, state agencies already have an important share in the state's resource economy. The Massachusetts Department of Natural Resources administers 197,000 acres, or almost 4 per cent of the land area of Massachusetts. The Metropolitan District Commission controls a further 129,000 acres, or about 2.5 per cent. Although 83 per cent of the M. D. C. holdings are watershed common lands, planning and policy decisions by the state agencies could obviously do a great deal to determine the future shape of the land environment and of recreational land use in Massachusetts.

### Water Resources

The water-supply position of Massachusetts is, in many ways, the epitome of modern resource problems in an urbanized area. These problems can be alleviated by short-run solutions. But they are subtle, complex, and essentially long-run in character. Apparent success in meeting minimum standards may conceal important losses--in quality perhaps more than in quantity. The optimum may be much more important than the maximum.

Massachusetts has an abundance of water supplies, with almost three thousand miles of larger streams, some thirteen hundred so-called Great Ponds of more than ten acres each, substantial though undetermined amount of ground water supplies, and--useful for some





purposes only--a diversified coastal shoreline. Metropolitan Boston, in particular, is the beneficiary of the foresight of the planners of the Metropolitan District Commission, who set aside eighty thousand acres of land in central Massachusetts and created the Quabbin Reservoir as a water supply area. When the watersheds created by other towns are added to the Quabbin area, a grand total of some 120,000 acres is achieved--almost 2.5 per cent of the land area of Massachusetts.

In spite of this abundance of water supply, Massachusetts is already experiencing serious problems of supply, quality, and competing uses. About 25 per cent of the rural water systems of the state are inadequate. During the dry year 1957, 63 municipalities in Massachusetts had to curtail water use because of shortages and distribution problems. Water crises have recurred in the dry years 1963 and 1964: communities in the Merrimac River Basin and the Narragansett Bay Drainage Basin have had to go outside their own areas to augment local water supplies. Both industrial demands and municipal requirements will expand with higher populations and incomes. In addition, private water consumption is increasing in many different directions: from lawn sprinklers to backyard swimming pools and golf courses. Although Massachusetts is already a highly urbanized state, it must be assumed that ever-higher percentages of its population will reside in metropolitan areas. This shift alone would be sufficient to increase water use. An estimate of a decade ago, which already seems conservative, placed likely water use in





the year 2000 at double the mid-century level.<sup>1</sup>

Maintenance of acceptable water quality is probably more important, in Massachusetts, than the provision of the necessary quantity. Although most industrial uses of water involve a final return of the water "used" to streams or water-bearing strata, this water has often undergone changes in chemical composition. Most industries require pure water for operations other than cooling; yet many important users of water cannot maintain this purity after use except at the cost of re-purification. Sewage dilution, another important use of water, affects both quality and quantity. Minimum stream flows may be required. These, in turn, may involve extensive construction of reservoirs.

The chemical quality of water in Massachusetts, in its natural condition, is excellent. Most of the state's river waters are classified as "soft" waters. Although some ground water or deeper aquifers have high mineral content, this does not create any important difficulties. The problem of quality is therefore almost entirely man-made.

Although the great majority of streams in the state as a whole are not polluted, serious pollution problems exist in all sections of the state. The New York-New England Inter-Agency Committee estimated, in 1954, that 132 miles of the state's three thousand miles of streams were grossly polluted, 415 miles seriously polluted, and

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1. Estimate contained in Report of the New York-New England Inter-Agency Committee, 1954.



376 miles substantially polluted. This pollution came from many sources, some from across state lines in New Hampshire and Vermont but most from municipalities and industries within the state itself. Municipal and residential sources of pollution were about twice as important as industrial sources. An additional amount of pollutants were being discharged directly into the Atlantic Ocean, creating numerous harbor, beach, and clam flat pollution problems along the shoreline.

A great deal has been done to reduce pollution in the ten years since these conditions were described. But current information indicates that increasing population and expanding industries are creating new problems of pollution almost as fast as the old ones are eliminated.

Massachusetts is a member of the New England Interstate Water Pollution Control Commission, an organization established to bring together the various interests in the region concerned with problems of controlling water pollution. Working through several Federal programs, the Commission has been active in the planning and construction of pollution control works throughout the region. Federal construction grants of \$41 million have been approved since 1956 for 241 sewage works projects throughout the region, estimated to cost a total of \$128 million. During fiscal 1963, Massachusetts received almost \$2 million of Federal construction grants for municipal treatment plants under this program. The Commission is also sponsoring a classification system for the interstate waters of the area which provides a





mechanism for classifying interstate waters according to their highest use. The Commission also sponsors research on waste treatment, and carries out activities in connection with legislation for pollution control.

According to the Commission, Massachusetts now has a population of 3.7 million (71 per cent of the total population) served by sewer systems. Of this 3.7 million, 2.1 million, or 56 per cent, are in areas in which sewage is treated. Plants are now under construction which will service an additional 1.1 million, or 31 per cent, and plans have been approved for plants which will account for another 71 thousand, or 2 per cent. Preliminary engineering reports have been approved for projects servicing a further 8.5 per cent of the population, leaving less than one per cent with no plan either in progress or proposed. But, with suburban growth, further plans will constantly become necessary as new sewage systems are steadily being installed.

In addition to problems of an adequate quantity and quality of water, there exist occasional problems of flood control. Many flood-control projects have been initiated since the floods of 1955 and new projects and programs have entered the planning stage. Flood control work in Massachusetts today is almost exclusively a function of the Federal government, with major responsibilities resting with the Army Corps of Engineers and the Soil Conservation Service of the U. S. Department of Agriculture. The Corps of Engineers is involved in a number of major flood control works throughout the state, and the Soil Conservation Service is actively engaged in a lesser number of



small watershed flood control projects. The Corps of Engineers is presently engaged in a comprehensive three-year study of the Connecticut River Basin. An important objective of this study is to determine future flood control projects that can be carried out on a multi-purpose basis--providing simultaneously for recreation, municipal water supply, hydro-electric power development, and other uses.

Since flood control projects usually involve large capital investments, and frequently pre-empt reservoir sites and water flows which have other possible uses, full consideration should also be given to alternative methods of achieving flood control objectives. Specifically, flood plain zoning is an approach to the problem of flood control which deserves consideration. The purpose of such zoning is to place limitations on the construction of new houses, stores, factories, and similar developments along the shore and in the immediate flood plains of rivers and streams. These areas would then be reserved for such uses as playgrounds, footpaths, and agriculture. A number of towns in Massachusetts have already incorporated flood plain zoning regulations into town Master Plans, and this type of zoning is being approached on a regional basis in certain parts of the state. The primary needs in this area are: (1) the application of modern methods of analysis to the problem of determining costs and benefits obtainable from flood control projects of various types v s. flood plain zoning. (computer simulation problems involving river basins are already under intensive investigation at Harvard University); (2) investigation of possible frameworks of public administration, and





of collection and disbursement of receipts, in order to overcome problems of geographical conflict of interest between areas incurring costs and areas receiving benefits. Federal funds should be of great assistance here, but they are unlikely to carry the entire load.

Finally, the recreational uses of water are large, and growing rapidly. Recreational use of water frequently conflicts with other uses, and such conflicts can be expected to increase in future. The magnitude and location of future recreational demands must therefore be estimated before an inclusive water resources policy can be established.

Two examples will indicate how conflicts involving recreation may arise in Massachusetts:

1. Water supply reservoirs have traditionally been established and managed exclusively for purposes of providing municipal water needs, and any other use has been prohibited. Pressure is increasing to open such areas for various types of recreational activity, such as fishing, boating, swimming, and picnicking. It is maintained in some quarters that these reservoirs can safely be put to such uses, since their contents usually go through a purification treatment prior to human consumption. Others believe that such recreational uses would create a public health hazard. This question is a most important one, which deserves more exploration than it has received thus far. Even in multi-purpose reservoirs, conflicts may develop during periods in the summer when reservoir levels would normally be low and recreation demands are at their peak. Reduction



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of such conflicts may require an increase in reservoir capacity, chargeable against recreation.

2. The Massachusetts law which created the so-called Great Ponds was designed to assure public use and enjoyment of these resources, but the law overlooked the question of providing and assuring access to these bodies of water. Many of the Great Ponds in Massachusetts have since been completely surrounded by private property which prohibits public access.

Water problems are complex with respect to both supply and demand, long-run in character, and often require uniform or integrated solutions over extended geographical areas. Moreover, the economic functions of water are capable of changing drastically over time: in the early nineteenth century, for example, large quantities of fresh water were more important to Massachusetts in terms of obsolete uses such as canals and water-wheels than for any present uses. The evidence points to the need for a systems approach to Massachusetts water resource planning; i.e., an approach capable of incorporating a number of variables, some of them interacting, in order to reflect the need for multi-purpose development. The skills required to solve water supply problems are also diverse--ranging from scientific through engineering to economic, administrative, educational, and political. Crisis solutions are likely to work badly in this area. Fortunately, such solutions are unnecessary. Water problems do not change their basic features overnight, and the analytical techniques needed to solve them are being rapidly improved.

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 problem is of great importance in the theory of  
 functions. The second part is devoted to the  
 study of the properties of the function. It is  
 shown that the function is continuous and  
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Energy Resources

Massachusetts has been at a disadvantage with respect to energy resources since the steam engine became efficient enough to compete with the water-wheel. Textile mills at seaboard locations could minimize this disadvantage by bringing coal up the coast; but there remained the cost of hauling coal from inland mines to tidewater. This disadvantage has been increased, industrially, by the absence of commercial deposits of minerals other than fossil fuels. Most mining in the state had passed its peak before the industrialization of the state really got under way. The energy disadvantage carries over from the industrial to the commercial, residential, and travel markets.

However, this familiar disadvantage has been changed from "natural" to partially "artificial" due to certain activities of the federal government and certain other states.

The main artificial barriers to cheaper energy in Massachusetts have to do with petroleum. These artificial barriers derive from quotas on the import of two different products: residual oils, and crude oil. (Residual oils are the least valuable by-products of refining, while crude oil is the raw material for refining) The quota on residual oils has received a great deal of attention in New England. It has been under persistent attack by the New England Council, as well as by the governors of the New England states and members of the New England Congressional delegation. From the standpoint of long-run harm to the New England economy, quotas on residual oil are a matter of importance. But quotas on crude oil are much more import-





ant. They not only raise the price on a basic industrial raw material which goes into a wide array of producer and consumer goods, but they also force Massachusetts consumers to contribute to both the oil-producing states of the United States and the oil-consuming states which are located inland and do not use imported oil. In crude petroleum, the U. S. government sponsors and enforces--but fundamentally does not control--a system which raises Massachusetts gasoline prices and fuel bills, and may even deprive Massachusetts of a petrochemicals industry.

The two types of Federally-imposed quotas will be examined in ascending order of their importance:

1. The quota on residual fuel oil involves a product whose production in the United States is steadily declining as refinery techniques are improved. In 1930, the first year for which separate statistics are available relative to output of residual fuel oil by U. S. refineries, this output amounted to 291 million barrels or 30 per cent of total output of U. S. refineries in that year. The peak of residual oil output by U. S. refineries was reached in 1948, at 480 million barrels, or 22.6 per cent of U. S. output. By 1962, U. S. refinery production of residual fuel oil had dropped to less than 296 million barrels, barely above the production of 1930 and only 9.1 per cent of a greatly-expanded refinery output.<sup>1</sup> Residual fuel oil typically sells, at the refinery, at a lower price per barrel

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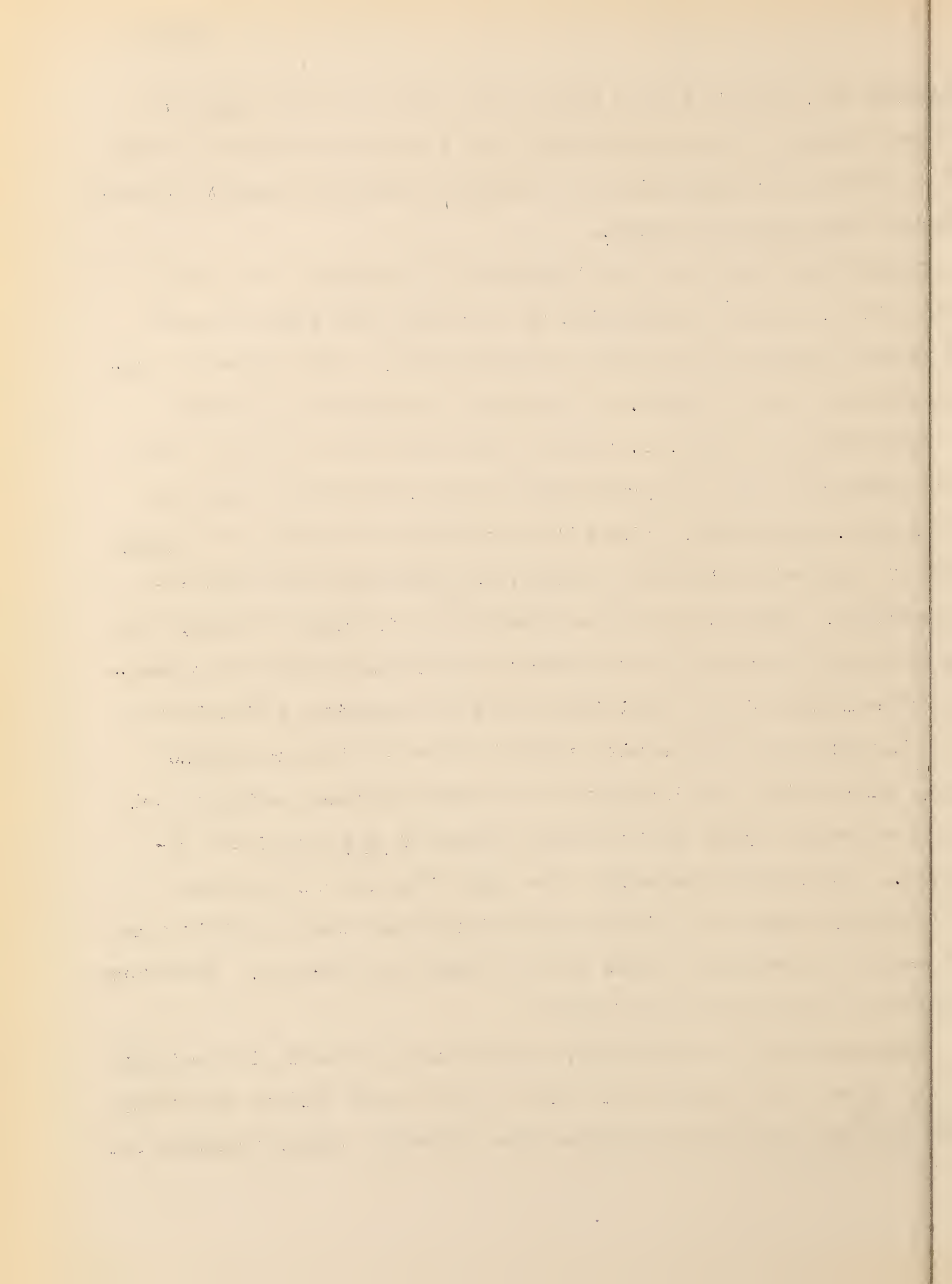
1. Data in this paragraph are from American Petroleum Institute, Petroleum Facts and Figures, 1959 edition, pp. 110-111, and 1963 edition, p. 73.



than crude oil, and at a much lower price than any other important refinery product, so that refineries have a strong incentive to shift out of residual oil production as refining techniques improve and markets for other products expand.

Between the 1930's and the imposition of residual oil quotas in 1959, U. S. domestic production of residual oils almost doubled and imports increased by as much as twenty-fold. This increase combined with the drop in the U. S. refinery contribution to raise the import share of the U. S. market from only five or six per cent of the share held by U. S. production in the 1930's to as much as half of U. S. production. Since the imposition of quotas, the total supply of residual fuel oils to the U. S. market has been held almost constant. Imports have been permitted to increase further, but only by enough to allow for the continued decline in domestic production. The impact of the stabilization of the quantity available to the U. S. market has fallen with special force on the New England states, which before the imposition of quotas consumed residual fuel oils in an amount equal to the entire output of all East Coast refineries. New England possessed less than five per cent of East Coast refinery capacity, and the entire East Coast was a deficit area with respect to residual oil as well as other oil products. Therefore New England relied heavily on imports.

Massachusetts, in particular, was consuming between five and six per cent of all the residual oil used in the United States (including bunker fuel for ships) before quotas were imposed. Use of residual oil





by Massachusetts gas and electric power plants typically ran between one-sixth and one-seventh of national use, and use of residual oil for heating in Massachusetts accounted for about ten per cent of the U. S. total.

The residual oil quotas were expected to be of greater assistance to the U. S. coal industry than to oil producers or refiners. Residual oil has become too small a part of U. S. refinery output (and must sell at too low a price if it is to compete effectively with coal) to provide the U. S. oil industry with appreciable gains from the quotas. Even for the coal industry, gains in prices and employment from the quota are by no means certain. Coal has managed to survive many post-war difficulties by a high degree of mechanization which has retained enough markets for coal to reverse its previous decline in tonnage sales; but the cost of this mechanization has been a sharp decline in employment in the industry. The connection between Massachusetts consumption of coal and Appalachian unemployment is, at best, highly indirect if it exists at all. As for the benefits to coal from a larger share of the Massachusetts market, it should be noted that this market for all industrial fuels is unusually small precisely because the high cost of such fuels in Massachusetts has discouraged the growth of industries which are heavy fuel-users.

On balance and in the short-run, the U. S. coal industry has probably gained some small amount of total revenue from the residual quotas. The problem, therefore, becomes: why, in view of the high cost of fuel in Massachusetts under the best of circumstances and the state's severe winter climate, should Massachusetts bear such a heavy





share of the contribution? The present program for Appalachia, based on a national effort to assist the entire economy of the region, would seem to be an alternative which is greatly preferable to the use of residual oil quotas as a means of solving Appalachia's problems.

2. The quota on crude oil, imposed also in 1959, involves a product of much greater importance to Massachusetts as well as to the nation as a whole. From 1933 through 1940, the U. S. petroleum industry was on a net export basis. This position has been reversed in every year since 1945. U. S. exports of crude oil never exceeded half their level of the late 1930's, while imports climbed to ten and fifteen times their pre-war level and equalled ten per cent of domestic production by the mid-1950's. Meanwhile, measures for control of output had succeeded in raising crude oil prices to \$1.00 - \$1.25 a barrel in various mid-Continent fields by 1940. These controls were unnecessary in the vigorous market which followed on the removal of World War II price controls. Mid-Continent crude oil prices more than doubled between March, 1946 and December, 1947 and were increased by almost twenty per cent more in two price advances of 25 cents per barrel in July 1953 and February 1957. The major price advance of 1946-1947 occurred in a free market. The subsequent price advances were made, in 1953, and maintained, in 1957, in the face of rigid controls of output and rapidly-developing surplus capacity. Prices have been supported and even raised by rigorous state control of output in Texas, the chief producing state, and by additional state



controls in all other important producing states east of the Rockies except Illinois.

This successful state restriction of output to raise oil prices occurred simultaneously with a series of spectacular oil discoveries in other parts of the world--especially in the Middle East and in North Africa. Entire fields in the Middle East produce oil at the rate of five to ten thousand barrels per well per day, as against about twelve barrels per well per day for the United States as a whole, thirteen barrels a day for Texas, and just over a hundred barrels a day in Utah, which has had the highest daily output of any state except Alaska for a number of years. The Sheikdom of Kuwait alone has oil reserves comparable with those of the entire United States, although it is smaller than any American state except Rhode Island.

The policy of output control to raise prices has been combined with tax arrangements which made the drilling of oil wells an attractive investment for many persons, otherwise subject to high rates of income tax.

The result of these influences was twofold: creation of domestic excess capacity of about three million barrels a day, equal to at least forty per cent of domestic output, and a simultaneous large and steady rise in imports. Internal restriction was first supplemented by "voluntary" quotas, which tended to break down in the face of the very high profits to be made from expanding petroleum imports. Finally, in 1958, the quotas were made<sup>compulsory</sup> with only





crude oil imports entering the United States by land from Canada and Mexico exempted. These import quotas are separately established for the West Coast and for the rest of the United States. They are presently running at a total rate of 1.1 million barrels per day of which just under 800,000 barrels are permitted for the area east of the Rockies. The combined national import quotas are sufficient to supply only about one-tenth of total domestic refinery input.

From the standpoint of Massachusetts, these arrangements have the following features:

1. The import quotas, as well as the three million barrel surplus capacity, are "justified" on grounds of national defense; yet the output decisions actually are made by state bodies such as the Texas Railroad Commission, and the import quotas are established by the Secretary of the Interior. The Secretary of Defense has no direct voice in either phase of the control of crude oil.

2. Whatever the defense case for import quotas, the operation of the present quota system is indefensible.

Almost one-third of the identifiable, integrated oil companies marketing east of the Rockies received quotas permitting them to import oil by sea even though they had no marketing facilities in any seaboard state. A further fourteen identifiable companies had marketing facilities in coastal states only along the Gulf of Mexico, including Florida. Most of these coastal "importers" marketed in Texas, or Louisiana, or both. So imports of oil, from their standpoint, would amount to carrying coals to Newcastle. The total of quota recipients who could not, or normally would not, import oil therefore adds to three-fifths of the grand total of identifiable import recipients east of the Rockies.



This discrepancy between import quotas and capacity or desire to import is further illustrated by the geographical distribution of foreign oil as a refinery input. The east and west coasts of the United States together account for ninety per cent of all foreign oil inputs, with a margin of almost two-to-one for the east coast. Most inputs in east coast refineries are of foreign oil, whereas the percentage is less than half as great on the west coast and below five per cent elsewhere except for Minnesota, Wisconsin, and North and South Dakota, where the foreign oil is probably quota-free crude from Canada.

The commercial result of this uneconomic distribution of quotas is a lively market in import quotas. Interior refineries which could not import anyway, and Texas refineries which are distant from the cheapest sources of crude imports can sell their rights to import and thereby reduce the prices they charge to the users of their products at the expense of the east coast

3. Massachusetts is a particular loser from this government sponsored restrictions. If it consumes close to fifteen per cent of all residual heating oils used in the United States, it also consumes over eleven per cent of all heating oils-- and its consumption of all heating oils taken together is four times its

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<sup>1</sup>Petroleum Facts and Figures, 1963, pp. 126-137, for marketing areas; Wall Street Journal, December 9, 1964, p. 8 quota allotments.

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consumption of residual--to say nothing of consumption of gasoline, kerosene, and other petroleum products. Massachusetts shares with the rest of New England the best location in the United States for the reception of Middle Eastern oil--on the one hand, far from all native fuel sources; on the other, closer to the Straits of Gibraltar than most other ports (e.g., Boston is almost one-third closer than New Orleans). Yet east coast refining in general is below its prequota levels. Massachusetts refining capacity has declined by three-fifths, to a miniscule 0.2 per cent of the national total. Thus an efficient potential location for refineries, with attendant benefits extending beyond oil into petrochemicals and other fabricated articles, is being pushed even farther below the national refining average by a system which defies the facts of geography as well as of economics.

The Secretary of the Interior has promised to hold public hearings in March "looking to a major revision of all aspects" of oil import controls.<sup>1</sup> In the light of the foregoing, Massachusetts should be strongly represented at these hearings.

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<sup>1</sup>Wall Street Journal, December 9, 1964, p. 8.





## CHAPTER VII

### PRIMARY INDUSTRIES

In terms of income and employment each of the three historic industries of Massachusetts: agriculture, forestry and fishing, has sunk to a subordinate place in the state's economy. Agriculture now accounts for less than one per cent of total Massachusetts employment; fisheries provide jobs for just over half of this number, and total forestry employment, in a range of 1500-2200, is only about one tenth of one per cent of all Massachusetts employment. Therefore, these primary industries, combined, are responsible for only 1.5 per cent of Massachusetts jobs. These industries are still worthy of separate consideration as parts of the economy of the Commonwealth. In a state not blessed with abundant natural resources, the fisheries represent both a specialized employment and an attempt to reach out for such resources wherever they may be found. The forests of Massachusetts provide a source of a bulky raw material which is basic to several of the leading industries of the state: paper, furniture and lumber and wood products. Heavy penalties in transport costs for long distance shipments are the price of the state's inability to supply their requirements fully. As is evident from Table 1 in Chapter III, the three major wood industries alone account for employment in Massachusetts of over 50,000 persons, or twenty-five times the direct employment in Massachusetts in woods operations. On the other hand, forests and agriculture together share control of the vast bulk of the land area of Massachusetts.



## CHAPTER VII

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Agriculture

Table VII-1 relates Massachusetts agriculture to that of the United States as a whole.

Relative to the rest of the Massachusetts economy or to agriculture in the rest of the United States, Massachusetts agriculture has the following attributes:

1. It is very small. The ratio of persons working on farms to total population is only one-seventh as high in Massachusetts as it is in the entire United States. Both land in farms and harvested cropland in Massachusetts were less than half the ratio of Massachusetts to U. S. land area.

2. It is market-oriented. Massachusetts farmers sell more of their produce relative to home consumption than the national average. They incur higher farm production expenses relative to cash receipts.

3. But on the whole, Massachusetts agriculture is not prosperous. Realized net farm income per operator in Massachusetts is slightly below the national average for an industry which, in turn, yields low average incomes. This observation must, however, be viewed in the light of the unusual opportunities for non-farm income available to some of the state's farm operators.

4. Between 1950 and 1959, the number of farms in Massachusetts was cut in half. The decline for the United States, over the same period, was 31 per cent. This followed a wide divergence in rates of decline between 1940 and 1950: over 30 per cent for Massachusetts; under 12 per cent for the United States. Cumulatively, between

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TABLE VII-1

PERCENTAGE RELATIONSHIP OF MASSACHUSETTS  
TO THE UNITED STATES  
POPULATION, LAND AREA AND AGRICULTURE

<u>Massachusetts to U. S.</u>	<u>1950</u>	<u>1955</u>	<u>1960</u>
Population	3.10%	-	2.87%
Land Area	0.22	0.22%	0.22
Land in Farms	0.14	-	0.10 (1959)
Harvested Cropland	-	-	0.09 (1959)
Persons working on Farms	-	-	0.41 (1959)
Family Workers	-	-	0.30 (1959)
Cash Receipts, Farm Marketings	0.66	0.57	0.47
U. S. Government Payments	0.21	0.17	0.10
Value of Home Consumption	0.39	0.38	0.31
Gross Rental Value of Farm Dwellings	0.78	0.56	0.61
Total Realized Gross Farm Income	0.63	0.56	0.46
Farm Production Expenses	0.77	0.67	0.54
Realized Net Farm Income	0.42	0.36	0.28

Source: See Sources on Table VII-5.



1940 and 1959, Massachusetts suffered a decline in farms of almost two-thirds, as against a U. S. decline of under 40 per cent. Moreover, these two declines took very different forms. Land in farms in the United States actually rose by 10 per cent between 1940 and 1959, and declined by less than 4 per cent between 1950 and 1959, for a net gain of 6 per cent. The comparable percentages for Massachusetts were: minus 14 per cent, minus 31 per cent and, net, minus 41 per cent. In 1959, the acreage per farm was smaller in Massachusetts than in any of the other states except North Carolina, New Jersey, and Rhode Island.

The value per average farm had slipped from above the national average, as recently as 1950, to 10 per cent below. The total value of all farm land and buildings in the state had increased by only two-thirds between 1940 and 1959, as compared with an increase of almost three hundred per cent for the United States as a whole.<sup>1</sup> Urbanization has probably absorbed farm land more rapidly in Massachusetts than in many other states; but the effect of urbanization on total farm valuations is two-edged. It raises the value of farms at the margin of the urban advance as it eliminates other farm values by converting them into urban values.

5. The returns to Massachusetts agriculture from Federal assistance are slight and shrinking. The Massachusetts farm share of U. S. government payments was under a third of the state's

1. Data in this paragraph were obtained from Statistical Abstract of the United States, 1963, pp. 614, 617.





share of cash receipts from farm marketings and half the Massachusetts share of realized net farm income, in 1950. This one-third share of government payments relative to marketings shrank to just over one-fifth in 1960, and the one-half share of income shrank to just over one-third. Moreover, dairy products are the only category of Massachusetts farm output covered by a Federal farm program. For the United States as a whole, about 45 per cent of the value of all farm products is typically accounted for by price support programs; for Massachusetts, annual sales of dairy products, less cows and calves, amount typically to 25-30 per cent of total cash receipts from marketings.<sup>1</sup>

This last point may have important implications for public farm policy as it relates to Massachusetts. As an overwhelmingly urban state, Massachusetts would in any case expect to pay for farm programs in higher prices and taxes a great deal more than its farmers could receive from such programs. But this normal imbalance is even further increased by the relatively, as well as absolutely, small share in farm programs allotted to Massachusetts farmers.

The close relationships between the urban and the rural economies in the state provide an important offset to the relative decline of agriculture.

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1. U. S. data from Statistical Abstract, 1963, p. 636; for Massachusetts data see Table VII-1.



Massachusetts had 11,149 farms in 1959. Of the operators of these farms, almost 40 per cent, 4,256, also worked off the farm for a hundred or more days per year, and 3,562 of these operators obtained non-farm incomes which exceeded their farm incomes. Moreover, the solid core of commercial farms selling more than \$10,000 of farm products per year remained nearly stable at about 3,650 farms between 1950 and 1960. The 60 per cent decline in the remaining farms--smaller commercial, part-time, and retirement farms--was concentrated near urban centers. Therefore, not all farmers were being forced off the farms by economic pressures. Many, perhaps most, were being pulled by better opportunities in urban employment.

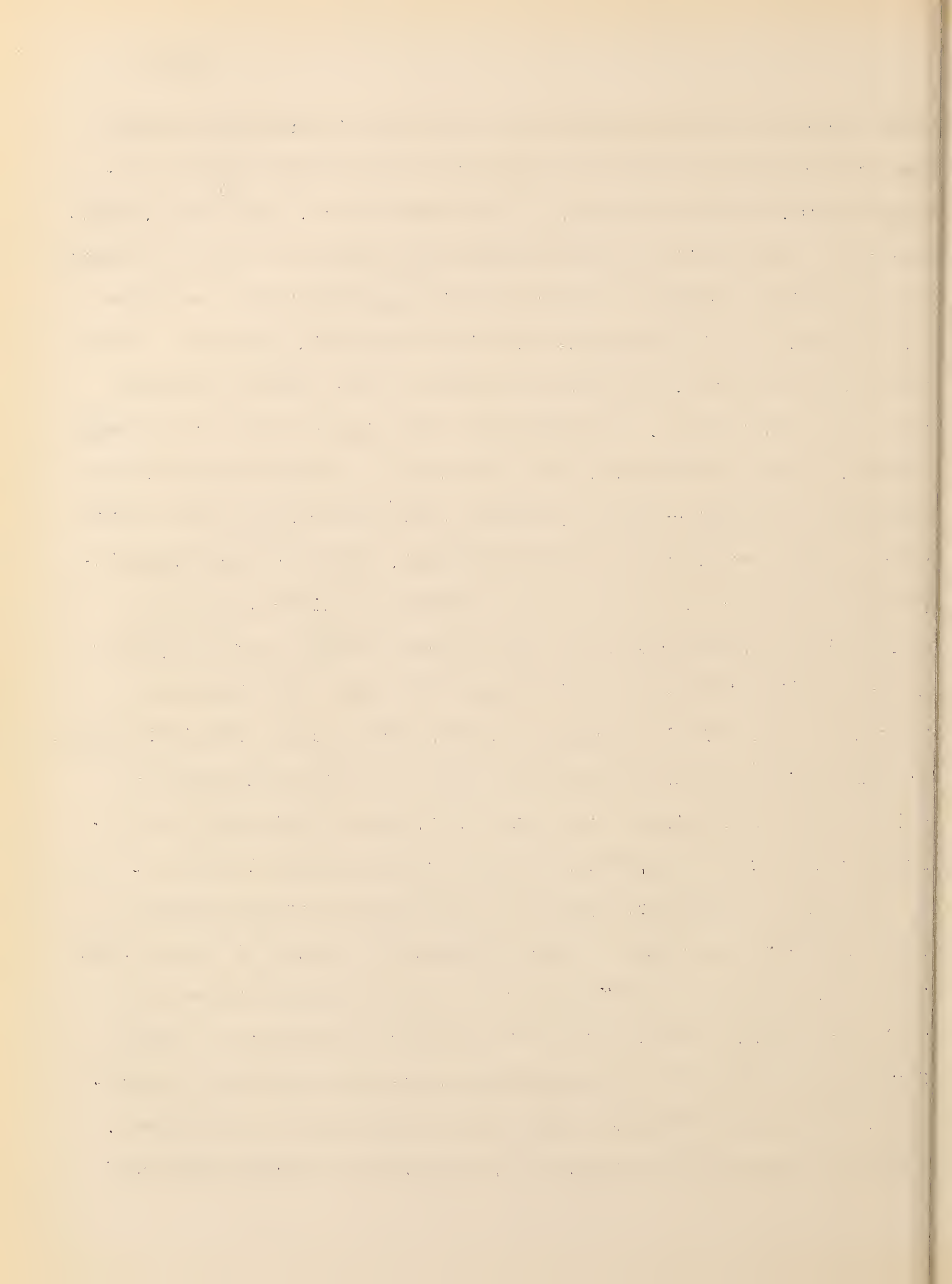
The nature of agricultural specialization in the different farming areas of the state also helps to explain the forces that affect the rate of movement into the cities. In spite of the general price rise since 1945, only dairy products have shown a growth in total cash receipts. Greenhouse and nursery products, with values reported only since 1950, also showed a modest increase of less than 20 per cent between 1950 and 1963. Poultry products, the leader among all farm categories with almost one-third of total cash receipts in 1945, gained further absolute and relative ground up to 1950 and declined afterward abruptly: egg production by almost 40 per cent since 1945 and 1950; poultry meat by 50 per cent since 1945 and by over two-thirds since 1950. Field crops lost over three-fifths of their cash value between 1945 and 1950, and





then recovered a small fraction of this loss in subsequent years. Cash receipts from livestock, other than poultry and fruits, remained almost constant in each of the years 1945, 1950, 1955, 1960, and 1963. The decline in poultry and egg production has run counter to the national pattern of stability in egg output and a substantial increase in the national output of commercial broilers. This relative development provides an example of the special problems which the state faces. Massachusetts must import feed, but so must several of the states which have moved into a dominant position in commercial broilers--Georgia, Alabama, North Carolina in the southeast, as well as Arkansas and Mississippi. Many of these rapidly-growing producers are served by the Southern railway, which has combined the introduction of a new type of freight car for grains and feeds (the "Big John") with deep rate cuts. The New York Central is the only New England railroad which comes within hundreds of miles of any surplus grain area, and it is probably also the only New England railroad not owned from Canada which has the resources with which to purchase fleets of new specialized cars.

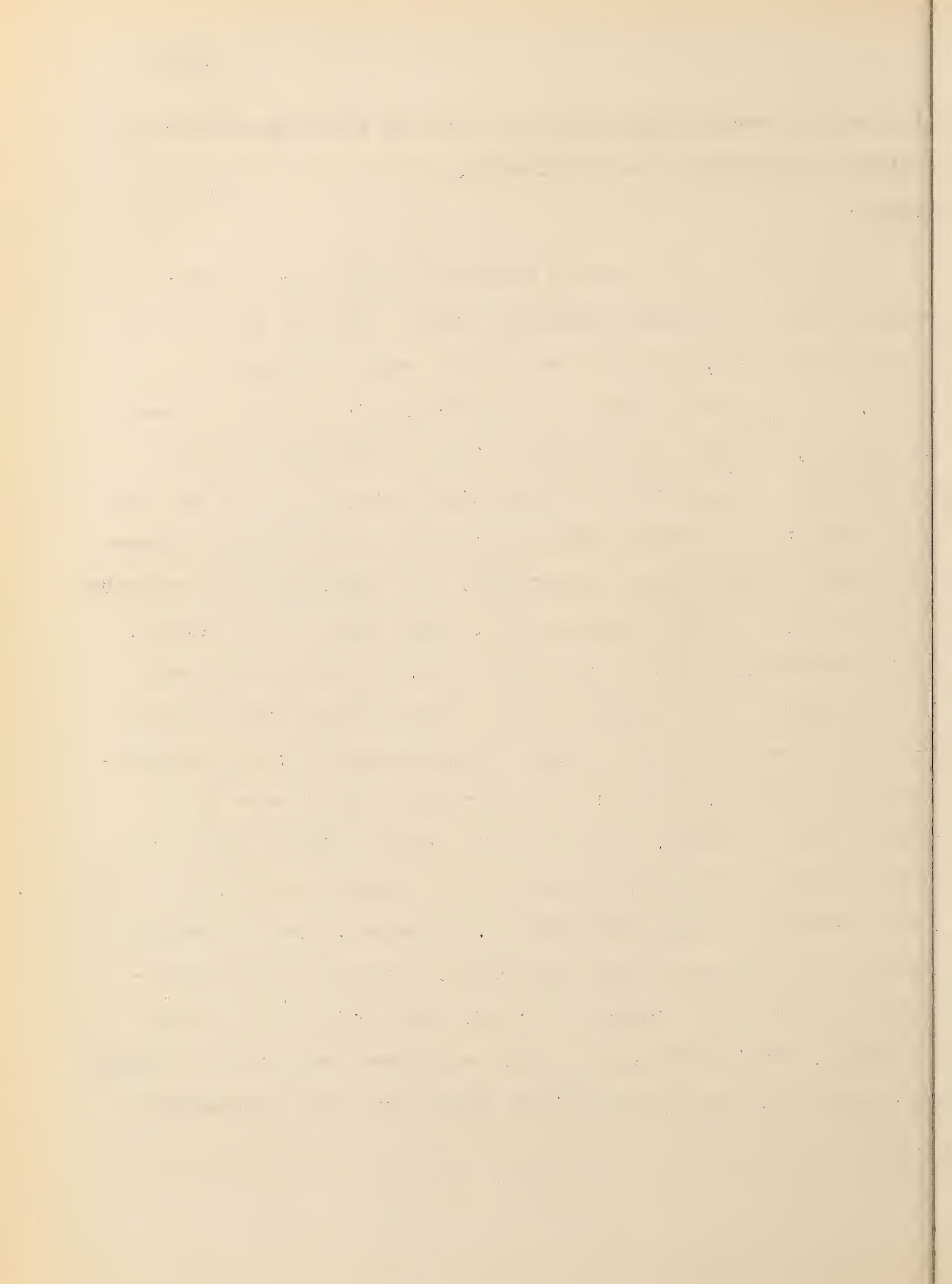
The job of obtaining grain and feed rates into New England which match the new rates to the southeastern states is complicated both by the inherent difficulties of interline negotiations for much lower freight rates and by the shortage of capital of most New England lines. The southeastern states have important advantages in poultry production quite apart from rail rates on feed. But their advantage is enhanced by an unusually solvent railroad



which can be sure of long hauls over its own lines as a source of receipts to pay for its new equipment.

### Forestry

A century ago, the forests of Massachusetts were already creeping back to repossess abandoned farms. Yet, of the state's five million acres, less than two million were in forests in the 1860's. By 1953, the acreage in forests had increased to almost 3.3 million, or just over 65 per cent of the land area of the Commonwealth. Thus, Massachusetts, with 0.22 per cent of the land area of the United States, had 0.43 per cent of the forest, almost double the national forest percentage. The Massachusetts commercial forest, at 3.26 million acres, was 0.61 per cent of the national total. Privately-owned forest lands of 2.36 million acres were 0.80 per cent of the national total. Almost 88 per cent of both total and commercial forest lands in Massachusetts were privately-owned, and only 12.2 per cent of commercial forests were in the hands of public bodies. For the entire United States public ownership accounted for 53.6 per cent of all acreage and 32.4 per cent of the acreage in commercial forests. Forests subject to Federal ownership and management made up only 0.9 per cent of all Massachusetts forests, as compared with 18.6 per cent for the nation as a whole. Massachusetts, however, was above the national average with respect to forest ownership by state and local governments:





11.4 per cent for Massachusetts; 5.1 per cent for the United States.<sup>1</sup>

Population, incomes, and transport requirements are all increasing rapidly in Massachusetts as elsewhere. In our densely populated state the forest cover is becoming increasingly important for general environmental and recreational purposes. This alone is sufficient to raise questions about the ability of unassisted private ownership to provide adequately for these future needs. The paradox of Massachusetts forest ownership, however, is that normal commercial incentives do not seem to provide adequate motivation for profitable development of the resources.

Table VII-2 which accounts for 96 per cent of the privately-owned forest lands shows that the average timber holding is even less than the average acreage in Massachusetts farms. The average forest holding is 92 acres, as compared with 102 acres--even though the average Massachusetts farm is smaller than the average in all but three other states. The median holding of forest land is just under fifty acres. If the position is expressed in terms of acreage rather than numbers of owners, the "under 100 acres" category accounts for over 44 per cent of the total acreage, and the "over 500 acres" classification for under 10 per cent.

Employment in the forestry industry, defined to include loggers, foresters, and other woods workers, has been variously estimated at 1500 in 1958 and 2200 in 1962.<sup>2</sup>

1. Statistical Abstract of the United States, 1963, p.686.
2. The former estimate is by the U. S. Department of Agriculture Forest Service; the latter is by the University of Massachusetts, Department of Forestry and Wildlife Management.





TABLE VII-2

SIZE DISTRIBUTION OF PRIVATELY OWNED  
MASSACHUSETTS FORESTS - 1952

<u>Size of Individual Holding</u>	<u>No. of Owners</u>	<u>Total Acreage</u>
3 to 50 acres	15,000 /	under 300,000
50 to 100 acres	<u>10,000</u> /	about <u>914,000</u>
Total - under 100 acres	25,175	1,214,000
100 to 500 acres	4,316	1,262,000
500 acres and over	<u>257</u>	<u>384,000</u>
Totals	29,758	2,860,000

Sources: Studies by U. S. Department of Agriculture, Experiment Station in Southern New England; and by the University of Massachusetts, Department of Forestry and Wildlife Management.



Even at the higher figure, this would yield the equivalent of one full-time, specialized worker for only about 8 per cent of the holdings, or for less than half the holdings of over 100 acres. There is obviously no reason why each such worker should be allocated, full-time, to an individual holding. But the fragmentation of holdings must tend to reduce, and distort, the operating unit at the expense of maximum efficiency in woods operations. It must also shift the emphasis toward felling the larger trees and away from cutting out the smaller ones. This fragmentation might still permit integrated woods operations and forestry development if the owners could easily be assembled in town meetings or elsewhere, to decide on common policies. Table VII-3 indicates how unlikely such an assembly would be.

The state's forest owners are a fair cross-section of the population. In view of the continuous movements into and out of the state over the last three centuries and the relatively slight supervision required of wood lots by absentee owners, it is likely that the functional differentiation of ownership is further complicated by geographical dispersion. The motivations for ownership are apparently as varied as the structure of ownership. Much of the timberlands of Massachusetts must involve acreage which was once cleared and farmed. Therefore, some of the current ownership reflects the small areas which could be managed by early nineteenth century farmers, possibly diluted by subdivision through inheritance. All of it was appropriated and parcelled out long before most of the United States was even explored. The state's forestry holdings, which primarily reflect their





TABLE VII-3

OWNERSHIP OF PRIVATELY OWNED MASSACHUSETTS FORESTS  
BY PRIMARY OCCUPATION OF OWNER

<u>Primary Occupation</u>	<u>Per Cent of Total Acreage</u>	<u>Per Cent of Total Number of Owners</u>
Farm Operators	25%	19%
Forest Industries	8	-- 1/
Others:	67	81
Business and Professional		18%
Laborers and Clerical		18
Housewives		10
Retired		10
Miscellaneous:		25
Clubs and Institutions, Public Utilities, Dealers in Forest Land, Owners of Recreational Businesses, Unsettled Estates, Students, Banks, Other Indus- trial Establishments		
	<hr/> 100%	<hr/> 100%

1/ Not separately listed. Should probably be credited with a part of "Miscellaneous."

Sources: Studies by U. S. Department of Agriculture, Experiment Station in Southern New England; and by the University of Massachusetts, Department of Forestry and Wildlife Management.



historical origins, are not scientifically, technically or economically adapted to the needs of the modern forester or industrial user of forest products.

The development of commercial wood production in Massachusetts, on anything like an optimum scale, does not seem likely unless there is more effective management of the forest lands. In many parts of the United States, the commercial forest is in large blocks--publicly or privately owned. Consequently, forest production possibilities can be exploited efficiently taking into account the multiple uses of forest lands. Policies can be established, and programs inaugurated that will ensure realization of potentialities at a stipulated future time while simultaneously allowing for the needs of today. This situation does not now hold in Massachusetts. In the absence of systematic forestry, the thin soils underlying much of the forest cover of Massachusetts are being squandered on an exuberance of underbrush instead of commercially-valuable growth.

Profit-oriented commercial forestry could be carried out so that it would not strip the forest cover of Massachusetts of its other values--ranging from aesthetic through recreational and water control. Improved forest management would, in fact, improve the accessibility of many forest lands, as well as their appearance. Good forest culture could improve the opportunities for hunting, fishing, hiking, and bird watching. Recreational activities within the commercial forest area need not be discouraged by a more commercial approach to forestry, and such an approach is not likely to reduce the total forest potential



by over 10 per cent. Improvement in insect and disease protection would be an offset to this reduction.

There would also be substantial secondary economic benefits from a more rational forestry policy. Massachusetts already possesses some 150 saw mills. Many of the communities which pose the most serious problems of economic decline, when viewed from the standpoint of their agricultural base, or their absence of special attractiveness for most industries, are the best situated in relation to industries using wood.

Massachusetts forestry may require public intervention to achieve maximum profitability. Success in achieving this is also more likely to further rather than to retard the achievement of other public policy goals with respect to forest lands. The barrier to be surmounted is the barrier of small, heterogeneous, and sometimes absentee, ownership units confronting an economy and a technology which demand larger and more specialized units for efficient operation.

## Fisheries

### Trends

The Massachusetts fishery is, in reality, a group of industries. Each of the three major ports--Boston, Gloucester, and New Bedford--specializes in a different species of fish, which may involve use of different techniques and equipment. These three ports accounted for 81 per cent of the total weight of landings in Massachusetts in 1963,, however, each port has a different trend of growth or decline. The quantity of fish landed at Massachusetts ports declined by 27 per cent between 1948-1950 and 1963. The value of Massachusetts landings





decreased by only three per cent over the same period.<sup>1</sup> In Boston, during this period, quantity decreased by 41 per cent, and value by 22 per cent; quantity decreased by 40 per cent, and value by 35 per cent in Gloucester, on the other hand, both quantity and value increased very substantially in New Bedford: quantity by 35 per cent; value by 60 per cent. It must be noted, however, that 1963 was an abnormally good year for New Bedford.

These disparate trends reflect the shifting fortunes of different sectors of the industry. The haddock fishery is the most important in the Commonwealth in terms of both quantity and value of landings. It accounted for about 25 per cent of both quantity and value of Massachusetts landings in 1963. This fishery is centered in Boston, which was the site of 61 per cent of Massachusetts haddock landings in 1963. The quantity and value of haddock landings both have been quite stable during the last decade.

The flounder industry, with 20 per cent of 1963 Massachusetts landings, by weight, and 19 per cent, by value, is centered in New Bedford which had 85 per cent of Massachusetts flounder landings in 1963. Landings of flounder increased by 141 per cent, in quantity, between 1953 and 1963, and by 64 per cent in value.

Sea scallops occupied third place in value of landings in 1963 with just under 19 per cent compared to 4 per cent on a quantitative basis. Sea scallops are landed almost entirely in New Bedford which had 96 per cent of Massachusetts landing in 1963. The value of sea

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1. For statistical sources, see Appendix tables.



scallop landings has moved irregularly since 1953, with no discernible trend. Quantity climbed steadily from 1954 to a peak in 1961, and has declined since.

Ocean perch, which account for 5 per cent of the value of landings, and whiting, with just under 4 per cent, are concentrated in Gloucester where there were 98 and 73 per cent of Massachusetts landings, respectively. Landings of ocean perch declined by 52 per cent in quantity, and by 36 per cent in value, between 1953 and 1963. Whiting landings were greatest during the years 1955-1960 and have decreased somewhat since then, but the value of the landings has not changed greatly except for three above-average years in 1957, 1958 and 1960.<sup>1</sup>

Although these sub-sectors of the fishery industry are tied to different shore locations, they are not mutually exclusive. Vessels generally fish principally for only one of the main species discussed above at a given time. But incidental quantities of other species may be caught as by-products of the main effort. Moreover, there is some transfer of resources as supply and demand conditions affecting the different species vary. This is especially characteristic of the seasonal Gloucester whiting fishery which is chiefly April to November, and between scallop and flounder fisheries out of New Bedford. There is also some exchange of vessels among different ports, within and beyond Massachusetts, on both a temporary and a permanent basis.

While the Massachusetts fishery industry has declined, over the last 15 years, fisheries in the rest of New England have had a growth

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1. Data in the preceding paragraphs were drawn from Appendix tables.







of 5 per cent in quantity over the same period and of 20 per cent in value. In the United States as a whole there has been no change in quantity, and a 7 per cent increase in value.

Employment in the Massachusetts commercial fishery has changed little between 1953 and 1963. A typical figure for employment during this decade is slightly under 10,000 fishermen. Since tonnage of fish landed has declined and value has risen only slightly, it is evident that physical productivity in the Massachusetts fishery has declined, and that value productivity has failed to keep pace with the rest of the Massachusetts industry or the national economy.

Employment on vessels, as distinct from employment on smaller boats and on shore, has decreased steadily from 5102 in 1953 to 3353 in 1963. This corresponds to the decrease in vessel numbers over the same period from 638 to 488. Another indication of the nature of the decline of the Massachusetts fishery may be obtained from the Boston fleet statistics. Although numbers of medium trawlers have stayed fairly constant, the number of large trawlers has decreased from 52 in 1948 to 25 in 1963. Trends in number of fishermen, and of vessels, for New England as a whole were similar to the trends in the Massachusetts fishery between 1953 and 1963.

On the whole the Massachusetts fishery has turned in a below-average performance, since World War II, in an industry which has in turn lost relative ground in the U. S. economy over the same period. An explanation for the Massachusetts record must therefore consider two separate problems. It must allow for national trends as well as



local peculiarities.

### Demand for Fish

Annual per capita consumption of commercially-caught fish and shellfish in the United States has not changed significantly for the last thirty years, averaging ten or eleven pounds. This figure is on an edible-weight, not a total weight basis and of course excludes a heavy volume of non-edible fish, such as menhaden. Still the key to the landed value of the catch lies in the per capita consumption. In addition to commercially-caught fish, fish caught by sportsmen provide a further 3.5 pounds per capita for consumption.

Within the practically stationary over-all figure for per capita consumption, there have been noteworthy changes. Per capita consumption of groundfish and of ocean perch fillets and blocks increased by 29 per cent between 1948-1950 and 1963, moving from 1.28 to 1.65 pounds. For sea scallops, the increase was from 0.13 pounds in 1951 to 0.19 pounds in 1962, for a gain of 32 per cent.<sup>1</sup>

The stability in per capita consumption has not been accompanied by significant price movements, absolutely or relative to other food prices. Wholesale price indices for fish, like wholesale price indices for basic foods in general, went up rapidly after the removal of price controls and have increased by less than ten per cent since 1950.

Therefore, from the demand side, the trend is one of gradual growth to match the increase in population; but without any apparent

<sup>1</sup> Fisheries of the United States, 1963, C.F.S. No. 3500, Bureau of Commercial Fisheries, U. S. Dept. of the Interior, Washington, D.C., April 1964, pp. 17-18.

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I have been thinking of you a great deal lately, and wondering how you are getting on. I hope you are well and happy. I have been very busy lately, but I have managed to find some time to write to you. I have been thinking of you a great deal lately, and wondering how you are getting on. I hope you are well and happy. I have been very busy lately, but I have managed to find some time to write to you.

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gains from the very large increase in money and real incomes per capita which has occurred over the last one and the two decades.

### Supply Factors

The most obvious influence at work on the supply side of the market for fish products, and the one most susceptible to influence by political means, is the growth in imports. Imports increased from one-fifth of total U.S. fish supplies in 1949 to over two-fifths by 1952, and to almost three-fifths in 1963. The total domestic catch was almost exactly stationary between 1949 and 1963, at 4.8 million pounds in 1949 and 4.75 million pounds in 1963. Over the same period, imports advanced from 1.2 million to 6.5 million pounds. For groundfish and ocean perch fillets, the position of imports was even stronger, with a gain from one-quarter of total supplies in 1949 to almost three-quarters in 1963. The most important source of imports is Canada, which was responsible for 55 per cent of groundfish and ocean perch fillets and blocks entering the United States from other countries in 1963. Iceland was next with 21 per cent. Part of the explanation for increased imports is in the lower wage rates which permit lower costs in Canada and Iceland, although Canada comes closer to average U.S. wages than any other country in the northern hemisphere. It is important to recognize, however, that their vessels and technology were also more modern.

The dominance of imports also developed in spite of tariff protection for the U.S. industry. Import duties on groundfish fillets on a per pound basis are  $1-7/8\phi$  on amounts subject to quota and  $2.5\phi$  on imports not subject to quota. On blocks of fillets, the





duties are 1¢ per pound for blocks of fifteen pounds or more, and 12.5 per cent ad valorem on blocks under fifteen pounds.

The import competition faced by the Massachusetts fishery has one feature possibly not duplicated in any other industry: both U. S. and foreign competitors do at least a great deal of their fishing in the same waters. In the absence of deliberate restocking or any other measure for converting the fishery from a "wild" to a "domesticated" resource base, the total supply of fish on which U. S., Canadian, Icelandic, and other fleets depend is to a considerable extent fixed. Virtually all of the catch landed at the principal Massachusetts fishing ports comes from international waters. The most important area accessible to the Massachusetts fleet is Georges Bank. The most extensive international regulations pertaining to the Georges Bank relate to haddock and cod. The International Convention for the Northwest Atlantic Fisheries, of which the United States and a number of other countries are members, led to a regulation of the mesh size in the nets used in the Northwest Atlantic haddock and cod fisheries. The Georges Bank haddock and cod fishery has been fished at or near maximum sustained yield for a number of years; therefore this mesh net regulation prevents depletion of stocks. But it does not control either the fishing effort of any member of the fleet, or the total permissible catch.

The other fisheries dependent on Georges Bank, which seem also to be near their maximum permissible yield, are subject to less control than haddock and cod. The local ocean perch fishery has been depleted,



due to intensive fishing effort and slow replacement of stock. The ocean perch requires ten to eleven years to grow to maturity as opposed to 2.5 years to marketable weight for the haddock.

#### The Outlook for the Massachusetts Fishery

The Massachusetts fishery is a mature industry. First, the industry is aging in a literal sense. Table VII-4 provides an age distribution of fishermen working out of the major Massachusetts ports in 1958.

TABLE VII-4

PERCENTAGE DISTRIBUTION OF FISHERMEN,  
BY AGE GROUPS,  
BOSTON, GLOUCESTER AND NEW BEDFORD - 1958

	<u>Percent of Fishermen Aged:</u>		
	<u>40 and under</u>	<u>41 through 50</u>	<u>51 and over</u>
Boston	9%	22%	69%
Gloucester	28	28	44
New Bedford	42	29	29

Source: The Groundfish Industries of New England and Canada, a Comparative Economic Analysis - Circular 121, U. S. Fish and Wildlife Service, Washington, D. C., July 1961, Pp. 102. This material was based on the membership files of the Atlantic Fishermen's Union.

[illegible][illegible]



These statistics not only reveal an aging labor force, but also hint at different conditions of labor supply in different labor markets. Boston, which on the whole is comparatively prosperous and with a broad choice of jobs, shows much less relative attraction of younger men to the fishery than Gloucester, although both ports have suffered marked declines in landed catch. New Bedford, with a growing output and a persistently higher rate of unemployment than Boston, attracts and holds relatively more young men in its fishing industry than either of its rivals. For fishermen life at sea is risky and arduous compared to other occupations. Crewmen must be away from home for as long as ten days or so at a time. Although total earnings may be comparable to those possible in other occupations requiring similar skill, crewmen are paid shares of the catch rather than wages (the "lay system"), and the value of each share fluctuates with both the quantity landed and the price on the day of landing. All things considered, the industry has not been attractive for young men.

The problems of labor force carry over into capital equipment and technique. Fishing techniques on most Massachusetts vessels have changed little for a number of years. Trawlers using the side trawling method continue to dominate the fleets, even though the stern trawling used extensively by European vessels offers such potential advantages as saving of labor and a decrease in loss of fishing time in high winds. The only stern trawler operating from a Massachusetts port is the Narragansett, launched in 1963 and fishing out of New Bedford.

The majority of Massachusetts fishing vessels suffer from age



as well as obsolescence. In 1958, the average age of the Boston haddock fleet was put at 21 years.<sup>1</sup>

Only two new vessels have been added to the Boston fleet since 1958, and these were of basically the same design as the older vessels.

The Gloucester fleet, which is particularly old, has had 24 ships lost at sea in the last five years alone. The New Bedford fleet is somewhat more modern. It has added at least 22 new vessels in the last five years, out of a total fleet estimated at about two hundred vessels.

Increasing costs and stable prices have contributed to a low return on investment although this could be offset somewhat by more modern vessels and equipment. High risks and old age have further increased costs by encumbering the vessels with high insurance rates. In addition, a 1792 law has prohibited the construction of fishing vessels in foreign countries, although foreign costs are lower and foreign designs are advanced. From 1961 to 1963, a Fishing Vessel Construction Differential Program (PL 86-516) granted a subsidy of up to one-third of vessel cost to help overcome this disadvantage. Eleven New England vessels were contracted for under this program. The United States Fishing Fleet Improvement Act (PL 88-498), signed in August, 1964, provides for a subsidy of up to 50 per cent of vessel cost, provided that the vessel is of modern design and will upgrade the fleet.

<sup>1</sup> John H. O'Brien, New England Haddock Fishery and Marketing of Haddock Products, 1948-59, Market News Service, Bureau of Commercial Fisheries, Boston, p. 11.

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Finally, fish unloading methods are obsolete and inefficient. For example, at Boston, the fish are pitchforked into baskets from the storage pens of the vessels, the baskets are hoisted onto the dock and the contents dumped into weighing boxes, and then the fish are pitchforked into wooden carts which are moved to the processing plants on the Pier. The inherent inefficiency of this method of handling is compounded by the fact that the skin punctures resulting from this method of handling cause more rapid bacterial deterioration.

The problems of the Massachusetts fishery appear to be more severe in Boston and Gloucester than in New Bedford and, even in the case of Boston, many facts are compatible with the hypothesis that the industry is declining because its labor force finds more attractive work elsewhere and imports can supply the market more cheaply. From an overall point of view there is nothing disastrous in either development. Nor is the pessimism entirely warranted in view of certain steps which could be taken and in some cases are being taken to increase the efficiency of the industry. For example, the new Marine Products Development Irradiator was dedicated in Gloucester in September, 1964. Built by the Atomic Energy Commission and to be operated by the Bureau of Commercial Fisheries, the Irradiator will test the radiation-pasteurization process for fish. The process could lead to dramatically-improved storage life. Even without the aid of a scientific revolution, processors are making progress in maintaining quality and improving marketability of fish products. On the manpower front, the Gloucester Fisheries Commission instituted a sixteen-week





on-the-job training program in July, 1964. In spite of a tradition of relative inattention, the Federal government is now beginning to sponsor research projects having to do with the Massachusetts fishery. Studies of the economics of Boston trawler operations, of materials handling on the Boston Fish Pier, and of the distribution of Boston Fish products are now being conducted by the University of Massachusetts. A new Commercial Fisheries Fund (PL 88-309) will provide up to \$300,000 annually to Massachusetts for the next five fiscal years for research and development of commercial fisheries.

In the absence of any prospect of really significant improvement in the productivity of the Massachusetts industry, a plea for any extensive aid, or even elaborate research, might seem ill-advised. But the industry has been neglected by research until very recently. Moreover, the industry exploits a resource which might, in the long run, be made to yield more abundantly than now.



TABLE VII-5

SELECTED AGRICULTURAL DATA - MASSACHUSETTS AND THE UNITED STATES  
(All Figures Except Percentages are in Millions of Dollars)

	<u>1950</u>	<u>1955</u>	<u>1960</u>	<u>1963</u>
Cash Receipts from Farm Marketings				
Mass.	188.4	169.8	159.3	159.0
U. S.	28,512.0	29,556.0	34,012.0	36,925.0
Mass.- Per Cent of U.S.	0.66	0.57	0.47	0.43
U. S. Government Payments				
Mass.	0.6	0.4	0.7	0.7
U. S.	283.0	229.0	693.0	1,686.0
Mass.- Per Cent of U.S.	0.21	0.17	0.10	0.04
Value of Home Consumption				
Mass.	8.7	6.9	3.9	3.2
U. S.	2,223.0	1,806.0	1,255.0	1,011.0
Mass.-Per Cent of U.S.	0.39	0.38	0.31	0.32
Gross Rental Value of Farm Dwellings				
Mass.	11.4	9.8	12.0	13.7
U. S.	1,464.0	1,741.0	1,974.0	2,115.0
Mass.-Per Cent of U.S.	0.78	0.56	0.61	0.65
Total Realized Gross Farm Income				
Mass.	205.0	186.9	175.9	176.5
U. S.	32,482.0	33,332.0	37,934.0	41,737.0
Mass.-Per Cent of U.S.	0.63	0.56	0.46	0.42
Farm Production Expenses				
Mass.	148.9	146.0	142.5	144.9
U. S.	19,297.0	21,862.0	26,242.0	29,219.0
Mass.-Per Cent of U.S.	0.77	0.67	0.54	0.50
Realized Net Farm Income				
Mass.	56.0	40.9	33.3	31.6
U. S.	13,185.0	11,470.0	11,692.0	12,518.0
Mass.-Per Cent of U.S.	0.42	0.36	0.28	0.25

<u>Massachusetts - Per Cent of U. S.</u>	<u>1950</u>	<u>1959</u>	<u>1960</u>
Population	3.10	-	2.87
Land Area	0.22	0.22	0.22
Land in Farms	0.14	0.10	-
Harvested Cropland	-	0.09	-
Persons Working on Farms	-	0.41	-
Family Workers, Including Operators	-	0.30	-

Sources: Historical Statistics of the United States . . . to 1957, Pp. 283; and Statistical Abstract, 1963, Pp. 634, for the United States. Data on Population, Land Area., etc., computed from Statistical Abstract, Pps. 10, 173, 614, 625 and 642.

For Massachusetts Receipts, Expenditures and Income: U.S. Dept. of Agriculture, FARM INCOME, STATE ESTIMATES, 1949-1963, Economic Research Service, FIS-195 Supplement





## CHAPTER VIII

### DISTRIBUTION

The service industries, broadly defined, are the largest employers of labor in the Commonwealth and have relatively the best record of growth. Unfortunately, there is almost no economic context which would permit these industries to be considered as a single group. The importance of these industries also extends beyond the employment they provide to their significance as sources of funds or outlets for savings, as in the case of banks and insurance companies, or in the extent to which they create a specialized market for skills interacting with the state's educational facilities.

Therefore, this chapter will not attempt to trace all of the manifold implications of the service industries for the development of Massachusetts. The discussion of a group which has nothing more in common than the fact that it does not produce tangible objects cannot be managed in a few pages.

Attention has been devoted, instead, to one pervasive subdivision within the service classification: the service of distribution. This will be considered first in terms of the physical movement of goods via various forms of transportation, and then their wholesale and retail distribution.

#### Transportation of Goods

There has been a transport crisis somewhere in Massachusetts almost continuously since 1945. The shrinkage of the supply of, and demand for, rail passenger service; the recurrent bankruptcies and service difficulties of bus lines as the private automobile reduces



their clientele; the efforts of Northeast Airlines to operate profitably, and the related disputes over routes to Florida--all of these have directed maximum public attention toward the problems of common-carrier passenger transportation. In view of this, this report will devote exclusive attention to freight. Moreover, the financial collapse of the New Haven, the difficulties of the Boston & Maine, and the merger proposals in which the New York Central is involved along with the Pennsylvania Railroad, all make it appropriate to concentrate on rail freight.

### Rail Freight Transport

Table VIII-1 summarizes the trend in tonnage of rail freight into, and out of Massachusetts in two significant years a decade apart: 1950, when the New Haven Railroad was just out of bankruptcy and regarded as a vital and profitable element in the Massachusetts economy; and 1960, when the New Haven was sliding back into a bankruptcy attributable in part to declines in freight business as well as monetary losses on passengers.

The erosion in short-haul shipments of rail freight to and from Massachusetts is evident in the table. Between them, New England and the Middle Atlantic States provided over five-eighths of the Massachusetts inbound tonnage under "Manufactures and Miscellaneous", in 1950, and two-thirds of the outbound tonnage, almost two-thirds of the total inbound tonnage, and over three-fourths of the total outbound tonnage. The New England and Middle Atlantic position was much worse by 1960, with almost a third of the tonnage of manufactures lost, inbound, and almost half lost, outbound; with total inbound tonnage down by over 40 per cent, and the total outbound tonnage down by over



TABLE VIII-1

TREND IN MOVEMENT OF RAIL FREIGHT  
TO AND FROM MASSACHUSETTS

TONNAGE: 1960 AS A PERCENTAGE OF 1950

<u>To Massachusetts</u> <u>From</u>	<u>Manufactures</u> <u>and Misc.</u>	<u>Products</u> <u>of</u> <u>Mines</u>	<u>Other</u>	<u>Total</u>
New England	68.4%	38.0%	59.3%	58.2%
Middle Atlantic States	68.4	43.5	97.1	58.7
Eight Medium Distance States*	71.5	91.7	83.7	80.3
Remaining States	133.1	88.0	95.4	109.9
Total	79.3%	53.3%	89.2%	71.9%

<u>From Massachusetts</u> <u>To</u>	<u>Manufacturing</u> <u>and Misc.</u>	<u>Products</u> <u>of Mines</u>	<u>Other</u>	<u>Total</u>
New England	45.9%	(included	38.7%	42.3%
Middle Atlantic States	59.3	in other)	65.8	60.2
Eight Medium Distance States	50.0		35.0	48.5
Remaining States	82.3		36.6	35.2
Total	56.5%		41.5%	53.7%

\* Maryland, Delaware, D.C., Virginia, West Virginia, North Carolina, Michigan, Ohio.

Source: U.S. Interstate Commerce Commission, Carload Waybill Sample, 1950 and 1960





50 per cent. The record for the states on a periphery extending from Delaware to North Carolina and around to Michigan is little, if any, better: "Manufactures and Miscellaneous", down 30 per cent inbound and down 50 per cent outbound; total tonnage down 20 per cent inbound, and by more than 50 per cent outbound. Both "products of mines" and other products held up much better, inbound to Massachusetts than other categories. The decline of the former by less than 10 per cent reflects an important relative shift in the source of the bituminous coal brought into Massachusetts by rail, from Pennsylvania to West Virginia, as well as the effects of import quotas on residual oils in stemming the loss of bituminous coal markets. The decline of "other" inbound tonnage from the peripheral states by only one-sixth is a reflection of the continuing importance of rail movements for inbound shipments of Midwestern agricultural products.

Once attention is shifted to all the states in the United States beyond the northeastern and mid-southern group already examined, the picture becomes entirely different. Inbound tonnage of "Manufactures and Miscellaneous" in 1960 had increased by one-third, and of all products by one-tenth, over 1950. Tonnage of "Manufactures and Miscellaneous" outbound from Massachusetts had dropped, but only by twelve per cent. Total outbound tonnage had dropped by only fifteen per cent. If tonnages between Massachusetts and the more distant states are added together, the result is an increase of fifteen per cent in "Manufactures and Miscellaneous", and of four per cent in total tonnage.

Therefore, the idea that the railroads are of declining importance to Massachusetts transportation is both true and false. It is true in the area for which it might be expected to be true--short and



medium hauls. It is false for long hauls. And these long hauls are beginning to represent a substantial fraction of aggregate tonnages--for example, up from 15 per cent inbound on "manufactures and miscellaneous" in 1950 to over 27 per cent in 1960; up from 18.5 per cent of outbound manufactures in 1950 to 23 per cent in 1960.

In addition to the general downward trend in rail tonnage, and to the differential trends within the over-all average which are pushing long-haul tonnages up and short-hauls down, there has been an increase in the relative gap between inbound and outbound tonnages. For "manufactures and miscellaneous", the ratio of inbound to outbound tonnage advanced from less than two-to-one in 1950 to over  $2\frac{1}{2}$ -to-one in 1960. For all shipments, the change in ratio was from just under three-to-one, in the earlier year, to a final ratio of almost four-to-one. This last comparison is rendered more striking by the loss of five-sixths of all anthracite coal tonnage inbound to Massachusetts between 1950 and 1960. Thus, the tonnage ratio shifted still further toward inbound shipments despite the near-disappearance of the largest single tonnage item, inbound or outbound, in 1950. For a number of reasons, rail cars entering Massachusetts carry heavier average loads than outbound cars. But the disparity was great, in 1960, even on a per-car basis: a ratio of inbound to outbound loaded cars of 2.2-to-one.

This preponderance of inbound over outbound loads might be expected to push outbound rates to levels below inbound rates due to attempts by the railroads to fill empty cars on their return journey.





The facts point in two different directions. Charges on "manufactures and miscellaneous" outbound from Massachusetts are less to most destinations, per car, than receipts on inbound cars, but this comparison is not entirely meaningful because inbound cars from all origins are generally more heavily-laden than outbound cars, to all destinations. The only major exception involves the exchange by rail between Massachusetts and the East North Central states--Ohio, Michigan, Indiana, Illinois, and Wisconsin. The routes running from Massachusetts to these states are competitive and heavily-used. Tonnages per car are almost identical in both directions. Therefore, traffic between Massachusetts and the East North Central States appears to offer the best available test of the "back-haul" hypothesis: that rates should be lower in the direction of movement for most empty freight cars. Table VIII-2 presents the factual disproof of this hypothesis.

Ton-miles per car westbound out of Massachusetts in 1960 were but 1.2 per cent higher than ton-miles per car eastbound. Revenue per car was only 1.0 per cent higher westbound. When the evidence in Table VIII-2 is summarized in this one comparison, it becomes obvious that eastbound and westbound rates between the two terminal areas are practically identical. The inference is either that the back-haul hypothesis contributes nothing toward the explanation of rates into and out of Massachusetts, or that the back-haul hypothesis can be supported only in the form of a statement that back-haul rates should be lower, and, in fact, are not.



TABLE-VIII-2

FREIGHT MOVEMENTS BETWEEN MASSACHUSETTS AND EAST NORTH CENTRAL  
STATES, MANUFACTURES AND MISCELLANEOUS, 1960

	<u>to Mass.</u>	<u>from Mass.</u>
Number of loaded cars (hundreds)	510	235
Tons per car	20.8	20.4
Average haul per ton in miles	841	868
Revenue per car in dollars	433.3	442.0

Source: I.C.C., Carload Waybill Statistics, 1960

TABLE VIII-4

AVERAGE MILES HAULED PER TON OF FREIGHT BY  
RAIL, MASSACHUSETTS AND UNITED STATES, 1960

	<u>Massachusetts</u> <u>Average</u>	<u>U.S.</u> <u>Average</u>
Products of agriculture	1210	450
Animals and products	1145	881
Products of mines	465	239
Products of forests	1997	555
Manufactures and misc.	633	497
Forwarder	967	1196
All commodities	724	361

Source: I.C.C., Carload Waybill Statistics, 1960



This failure of rates to respond to the pressure of empty west-bound cars probably cannot be explained by special equipment requirements in either direction. Special cars which must be returned empty are to be found in chemical and other such service, but they would not be important enough to cover the spread of 2.2-to-one in the ratio of eastbound to westbound cars.

The most likely explanation is that regulation of truck routes and rates by the Interstate Commerce Commission began in 1935, before trucks became important competitors of rail service on trips as long as those between Massachusetts and the East North Central states. This regulation has involved minimum rate control on both rail and truck as an impediment to competitive pressure on westbound rates. The artificial maintenance of the westbound rate may, in some cases, operate to hold down the eastbound rate. If so, Massachusetts consumers may gain, but some Massachusetts manufacturers may lose through lower costs to Middle Western competitors of reaching eastern markets.

A final question of interest with respect to Massachusetts railroads is the question of whether Massachusetts consumes, and produces, a large enough volume of rail-borne goods to warrant the highest quality of railroad service. The data in Table VIII-3 are presented as the first step in testing this hypothesis. This table shows that the very high population density of Massachusetts more than compensates for its relatively small share of heavy industry. As a result, the average of the tonnage originated and the tonnage terminated in Massachusetts per square mile is almost 2.5 times the national average, and the average





TABLE 3

DENSITY OF RAILROAD TRAFFIC IN MASSACHUSETTS  
AND IN THE UNITED STATES, 1960

<u>Per Square Mile of Land Area</u>	<u>Massachusetts</u>	<u>United States</u>
Tons of Rail Traffic Originated:		
Manufactures & Miscellaneous	295	109
Other	<u>107</u>	<u>296</u>
Sub-Total	402	405
Tons of Rail Traffic Terminated:		
Manufactures & Miscellaneous	804	109
Other	<u>758</u>	<u>296</u>
Sub-Total	1562	405
Average of above:		
Manufactures & Miscellaneous	550	109
Other	<u>432</u>	<u>296</u>
Average of Sub-Totals	982	405
Revenue:		
On Traffic Originated (dollars)	5504	(2465)
On Traffic Terminated (dollars)	<u>21093</u>	<u>2465</u>
Average of Originated and Terminated	13298	2465
Miles of Railroad	0.208	0.073
<u>Per Mile of Railroad</u>		
Tons of Rail Traffic Originated	1934	(5546)
Tons of Rail Traffic Terminated	<u>7526</u>	<u>5546</u>
Average Tonnage	4730	5546
Dollars of Freight Revenue:		
On Traffic Originated	26518	(33760)
On Traffic Terminated	<u>101617</u>	<u>33760</u>
Average Revenue	64068	33760

(United States data exclude Alaska and Hawaii)

Sources: I.C.C., Carload Waybill Statistics, 1960; and U.S. Statistical Abstract (for data on land areas and miles of road)



of the revenues from origination and termination, per square mile, is over five times the national average. Although the rail network of Massachusetts is at almost three times the average national density, per square mile of land, the dollars of freight revenue produced by Massachusetts originations and terminations come to almost twice the national average per mile of railroad. The tonnage figure is preferable in some respects, because it does not raise questions of the appropriate allocation of revenues to different states through which shipments pass. But even this figure is only about 15 per cent less for Massachusetts than for the country as a whole. For the "manufactures and miscellaneous" category, the average tonnage for Massachusetts was more than 60 per cent above the national average.

Therefore, any discussion of Massachusetts railroad problems which emphasizes the low density of rail shipments in Massachusetts appears to be confusing the market for rail service per capita with the market per square mile or per mile of rail line. The location of Massachusetts is such that the density of rail traffic moving over any one line is not assisted by a normal amount of "bridge" traffic, passing through from out-of-state origins to out-of-state destinations. But modes of transport can exist only as they originate and terminate traffic. Massachusetts provides opportunities for both which are far above the national average. If the statistics indicate the possibility of excessive railroad mileage, they also indicate a revenue potential to support railroad modernisation which has not been tapped to improve New England railroads in the last decade.





Finally, Table VIII-4 reveals that the average haul for shipments by rail which originate or terminate in Massachusetts is far above the average for the United States.

Thus, on the common assumption that long hauls are more profitable to the railroads than short hauls, Massachusetts provides an unusually attractive market for rail service per ton of freight transported. Unfortunately, all of the railroads serving Massachusetts, except the New York Central, are themselves short-haul railroads. Therefore, even though New England railroads receive divisions, or shares, of through freight rates which are often much higher than the distance the commodity is hauled, yet their share of <sup>^</sup>much of the gain from the abnormally long hauls involving Massachusetts must go to railroads outside the area. Moreover, the dependence of Massachusetts on rail service is relatively much greater than the tonnage figures suggest. Since the effectiveness of truck competition diminishes with distance, really long-haul rail shipments may involve a net dependence on rail transport (i.e., a comparative advantage of rail over the next-best transport contender) which is a good deal higher, per mile, than the net dependence involved in short hauls.

### Truck Transport

In 1963, truck registrations in Massachusetts totalled 183,345.<sup>1</sup> Not over five per cent of these trucks were operated as common carriers, and some farm trucks may have transported little tonnage during

1. Automobile Manufacturer's Association, Motor Truck Facts, 1964, p. 18.



the year. But even if every farm in Massachusetts had a truck, this would leave at least 170,000 trucks available for non-farm purposes. In order to account for as much tonnage as the railroads originate and terminate in Massachusetts, each of these trucks would have to load or unload only about one-half ton per working day the capacity of the smallest local pickup truck. Therefore, in terms of tonnage, it is obvious that truck transportation in Massachusetts is much more important than rail transport.

Common and contract truckers in Massachusetts have filed reports to the Massachusetts Department of Public Utilities for 1961, 1962, and 1963. One-third of the trucks reported to the Department were owned by 2.5 per cent of the trucking concerns; but the typical trucking concern owned only one or two trucks.

The largest truck carriers in Massachusetts, with revenues of over \$1 million per year, received three-fifths of total revenues in 1963 with only a third of total trucks. Carriers operating exclusively within Massachusetts accounted for 70 per cent of all carriers in 1963. They earned 30 per cent of the total revenues received by all carriers reporting in Massachusetts, with revenues at least twenty-five times as great as the total received by railroads for interstate shipments in Massachusetts.

#### Wholesale and Retail Trade

The most dramatic developments in retailing since World War II in Massachusetts as elsewhere in the United States, have been the growth of shopping centers and the development of the discount store.



Conversely, neighborhood and downtown shopping districts have declined. Retail sales have failed to grow at the same rate as population in the large metropolitan areas, in refutation of the previously reliable theory that retail trade gravitated toward the larger population centers.

These changes in retailing have had their effect on wholesaling. Large-scale retailing has been a factor in the adoption of direct marketing by manufacturers. The independent wholesaler's role has declined accordingly. The structure of wholesaling has also been profoundly affected by substantial improvements in transportation. These improvements have been especially noteworthy with respect to motor carriers. The increase in efficiency, flexibility, and speed of transport has permitted wholesalers to serve areas previously out of range.

#### 1. Retail Trade

Table VIII-5 shows that the growth of retail trade in Massachusetts has lagged behind the national rate in both 1948-58 and 1958-63. But the differences are moderate: 53.0 per cent to 45 per cent for the earlier period, and 24 per cent to 20 per cent in the later.

When the comparison is limited to individual retail categories, Massachusetts was more or less on a par with the nation in growth in retail sales of lumber and building materials as well as in growth of sales by automobile dealers. Massachusetts was above the national average growth in sales of general merchandise. Eating and drinking places gained considerably less than the U. S. average in 1943-58, and a great deal more in 1958-63.





TABLE VIII. 5 TOTAL RETAIL SALES, BY KIND OF BUSINESS, UNITED STATES  
AND MASSACHUSETTS 1948, 1958, 1963

UNITED STATES

	1948		1958		1963 <sup>a</sup>		
	<u>Sales</u> <u>(\$1000)</u>	<u>Per Cent</u> <u>of Total</u>	<u>Sales</u> <u>(\$1000)</u>	<u>Per Cent</u> <u>of Total</u>	<u>Sales</u> <u>(\$ million)</u>	<u>Per Cent</u> <u>of Total</u>	<u>Per Cent</u> <u>1948-58</u>
Lumber, Building							
Material, Hardware	\$ 11,151.5	8.5	\$ 14,309.2	7.2	\$ 16,347.2	6.6	28.3
General Merchandise	17,134.7	13.1	21,879.1	11.0	36,093.3	14.7	27.7
Food Stores	30,965.7	23.7	49,022.3	24.6	53,008.5	23.5	58.3
Automotive Dealers	20,104.1	15.4	31,807.9	15.9	43,495.2	17.6	58.2
Gasoline Service							
Stations	6,483.3	5.0	14,178.2	7.1	17,529.0	7.1	118.7
Apparel and Accessory							
Stores	9,803.2	7.5	12,525.5	6.3	14,171.8	5.7	27.8
Furniture, Home Fur-							
nishings, Appliances	6,914.2	5.3	10,974.2	5.0	11,550.8	4.7	45.7
Eating and Drinking							
Places	10,683.3	8.2	15,201.5	7.6	15,558.2	7.5	42.3
Drugs and Proprietary							
Stores	4,013.2	3.1	6,778.9	3.4	8,390.3	3.4	68.9
Other Retail Stores	13,267.4	10.2	18,468.3	9.3	n.a.		39.2
Non-Store Retailers	n.a.		5,401.3	2.7	n.a.		
Total Retail Sales	\$130,520.5	100.0	\$199,646.5	100.0	\$246,468.8	100.0	53.0

MASSACHUSETTS

	1948		1958		1963 <sup>a</sup>		
	<u>Sales</u> <u>(\$1000)</u>	<u>Per Cent</u> <u>of Total</u>	<u>Sales</u> <u>(\$1000)</u>	<u>Per Cent</u> <u>of Total</u>	<u>Sales</u> <u>(\$ million)</u>	<u>Per Cent</u> <u>of Total</u>	<u>Per Cent</u> <u>1948-58</u>
Lumber, Building							
Material, Hardware	\$ 240.6	5.6	\$ 311.4	5.0	\$ 346.4	4.6	29.4
General Merchandise	528.7	12.3	664.3	10.7	1,182.5	15.8	25.7
Food Stores	1,181.0	27.3	1,611.8	25.8	1,844.1	24.7	36.5
Automotive Dealers	505.8	11.8	825.8	13.2	1,090.8	14.6	62.9
Gasoline Service							
Stations	165.2	3.8	335.7	5.4	397.9	5.3	103.2
Apparel and Accessory							
Stores	373.3	8.7	447.9	7.2	490.9	6.6	20.0



Some of the forms of retailing which lost ground reflect national trends. Thus, the proportion of total retail sales represented by consumer purchasers of apparel declined by 1.8 percentage points for the United States between 1948 and 1963, and apparel sales in Massachusetts dropped by 2.1 percentage points over the same period.

## 2. Wholesale Trade

Massachusetts has also failed to grow as rapidly as the United States in wholesaling. Part of the difference may be explained by a slower rate of growth of population and production in the state. However, this is probably inadequate as an explanation for the entire differential. Whereas Table VIII-5 shows that Massachusetts sales at retail fell short of the national growth rate only by a margin of 45 per cent to 53 per cent, Table VIII-6 reveals a discrepancy, at wholesale, of 36 to 51 per cent. The national growth at wholesale was only two points below the national growth at retail. But the Massachusetts differential favoring retail was almost 10 percentage points. Consequently, the growth of Massachusetts sales at wholesale over the decade 1948-1958 lagged behind the national growth by almost eighteen percentage points.

Petroleum Bulk Stations gained by more than the overall national average between 1948 and 1958. They increased their sales by 74 per cent, reflecting the construction of pipe lines and storage facilities in New England in the 1950's.

"Assemblers" suffered an absolute decline, although this decline was less than that for the nation as a whole and therefore also repre-





TABLE VIII-6

TOTAL SALES, WHOLESALE TRADE - UNITED STATES  
AND MASSACHUSETTS, BY TYPE OF OPERATION - 1948 and 1958

<u>UNITED STATES</u>					
	<u>1 9 4 8</u>		<u>1 9 5 8</u>		
<u>Type of Operation</u>	<u>Sales</u> <u>(\$1000)</u>	<u>% of</u> <u>Total</u>	<u>Sales</u> <u>(\$1000)</u>	<u>% of</u> <sup>1</sup> <u>Total</u>	<u>Per Cent</u> <u>Increase</u> <u>1948-58</u>
Merchant Wholesalers	\$ 79,766,589	42.3	\$121,661,229	42.7	52.5
Manufacturers' Sales					
Branches	52,738,577	28.0	87,757,483	30.8	66.4
Petroleum Bulk Sta-					
tions	10,615,650	5.6	20,130,812	7.1	89.6
Agents and Brokers	34,610,092	18.3	46,422,643	16.3	34.1
Assemblers	10,957,893	5.8	8,998,640	3.2	-17.9
 Total Wholesale					
Trade	\$188,688,801	100.0	\$284,970,807	100.0	51.0
 <u>MASSACHUSETTS</u>					
Merchant Wholesalers	\$ 3,015,927	47.2	\$ 3,855,300	44.2	27.8
Manufacturers' Sales					
Branches	1,947,887	30.5	2,892,704	33.3	48.5
Petroleum Bulk Sta-					
tions	327,677	5.1	570,037	6.6	74.0
Agents and Brokers	1,036,620	16.2	1,299,645	15.0	25.4
Assemblers	68,120	1.1	60,053	0.7	-11.8
 Total Wholesale					
Trade	\$ 6,396,231	100.0	\$ 8,677,739	100.0	35.7

<sup>1</sup>Percentage may not add to 100 due to rounding.

Source: Census of Business - 1948 and 1958



sented a relative gain. The absolute declines both for the state and the nation reflected the fact that assemblers are to be found mainly in the marketing of farm products. In recent years a number of economic changes have combined to lessen farmers' need for the assembler's services. Farms are larger; transportation and communication in rural areas have been improved; cooperatives have become more active in some districts; and backward integration by processors is increasing.

Table VIII-7 shows the changes in the wholesale trade of Massachusetts, by county, between 1948 and 1958. The most important trend indicated by the table is the decline of Suffolk County, which contains the central wholesaling facilities of Boston. Suffolk County gained only 1.7 per cent in wholesale sales between 1948 and 1958, as compared with a gain of 35.4 per cent for the state as a whole. This great difference in trend reduced the share of Suffolk County from 74 per cent of the state total in 1948 to just over 55 per cent in 1958. Conversely, Norfolk County capitalized on its available space nearby with a growth in wholesaling from just over one per cent of the state's total to 6 per cent.

Tables VIII-6 and VIII-7 also reveal a relative decline in the importance of merchant wholesalers, who take title to the goods they sell. Although the reasons for this decline are not evident from the tables an important contributory factor is doubtless the growth of direct marketing by manufacturers. The sharp growth in sales of "manufacturers' sales branches" in Table VIII-7 is certainly attributable to this change. The growth of private truck transport relative



TABLE VIII 7

VIII-18.

WHOLESALE TRADE, MASSACHUSETTS:  
MORE WHOLESALE ESTABLISHMENTS,COUNTIES WITH 100 OR  
1958, 1954, 1948a

County by Type of Operation	Sales (\$1000)	Per Cent of Total	Sales (\$1000)	Per Cent of Total	Per Cent Increase 1948-58
Berkshire	\$ 69,734	0.8	41,519	0.7	68.0
Merchant Wholesalers	43,222		23,639		82.8
Other perating Types	26,572		17,880		48.6
Bristol	253,908	2.9	175,645	2.8	44.6
Merchant Wholesalers	176,713		117,204		50.8
Other Operating Types	77,195		58,441		32.1
Essex	362,728	4.2	189,214	3.0	91.7
Merchant Wholesalers	252,243		129,544		94.7
Other Operating Types	110,485		59,670		85.2
Hampden	428,498	5.0	278,679	4.4	53.8
Merchant Wholesalers	262,078		174,770		50.0
Other Operating Types	166,420		103,909		60.2
Middlesex	1,535,349	17.8	55,356	8.7	176.5
Merchant Wholesalers	587,811		246,488		138.5
Other Operating Types	947,538		308,868		206.8
Norfolk	512,794	6.0	69,905	1.1	633.6
Merchant Wholesalers	139,697		41,033		240.5
Other Operating Types	373,097		28,872		1192.2
Plymcuth	128,621	1.5	52,498	0.8	145.0
Merchant Wholesalers	84,073		34,878		141.0
Other Operating Types	44,548		17,620		152.8
Suffolk	4,770,727	55.4	4,691,453	73.8	1.7
Merchant Wholesalers	1,926,888		2,027,164		-5.0
Other Operating Types	2,843,839		2,664,289		6.7
Worcester			305,908	4.8	79.5
Merchant Wholesalers	548,982	6.4	203,672		71.0
Other Operating Types	348,339		102,236		96.3
	200,643				
Total Wholesale Trade <sup>c</sup>	\$8,611,341	100.0	\$6,360,177	100.0	35.4

<sup>a</sup>Data for 1948 or for counties with 50 or more wholesale establishmentsYearly totals differ from Massachusetts totals in table because  
of certain omissions.Source: Census of Business 1948, 1954, 1958





to for-hire trucking, as well as rail, is related to this shift. Overnight delivery from New York and New Jersey has also tended to shift some wholesale activity completely out of New England. The relative decline in central wholesaling also reflects changes in the railroad industry. Historically, the central metropolitan area was well served with main-line and feeder-line service. Economical wholesale operation required location near or on rail lines. But, such recent developments as piggyback and container services have freed carload shippers from the need to locate on a rail line. Pickup and delivery can be made over the highway, with the long haul reserved for rail. Thus, it is possible for shippers to get the equivalent of carload rail service without the need to locate on a rail line.



## CHAPTER IX

### RESEARCH AND DEVELOPMENT ACTIVITIES IN MASSACHUSETTS

The type of research undertaken in Massachusetts has been concentrated on military projects. Increased diversification into other research areas would strengthen the economy. There is little that the state government can do directly to diversify and provide over-all stimulation to research and development. However, the state programs and policies such as education and training activities which impinge on the research and development area should be reviewed with these effects in mind.

#### The Significance of Research Oriented Industries in Massachusetts

There is a substantial amount of evidence which connects technological innovation and economic growth. Innovation has a variety of sources and is related to the structure of industry as well as to basic advances in technical knowledge. Such advances are the basis for new industrial technologies and are, increasingly, the product of organized effort in private firms, educational institutions and public facilities.

Research and development generates directly only a moderate amount of employment and income. The indirect, growth-stimulating effects are much more profound. These effects are especially difficult to measure at the state level, yet the accumulation of examples of research-related industries being established in Massachusetts is strong evidence. It is probably more than coincidence that the emphasis in the state on basic research, as pointed out below, has been paralleled by the

[illegible]



relatively rapid growth of the scientific instruments industry.

Massachusetts has a relatively limited representation among those industries in which most of the research and development activities are carried out. Seven sectors (Aircraft and Missiles, Electrical Equipment and Communication, Chemicals and Allied Products, Machinery, Motor Vehicles and Other Transportation Equipment, Professional and Scientific Instruments and Petroleum Refining and Extraction) account for ninety per cent of industrial research and development activity. The extent of this activity nationally is shown in Table IX-1 which indicates the amounts and ranking of the research activities of the various sectors of the nation's economy.

These seven leading research and development industries which account for 15 per cent of the national employment, account for only about 12 per cent of employment in Massachusetts, as shown in Table IX-2. However, Massachusetts has a relatively larger amount of employment in the Electrical Equipment, Machinery, and Professional and Scientific Instruments Sectors, which are among the major research-oriented industries. The Massachusetts employment in the Aircraft and Missiles industry has been classified with Transportation Equipment. These sectors and the Chemicals and Petroleum industries have a lesser role in the state economy than in the entire nation.

Some of the Commonwealth's most important industries have relatively little research oriented toward their problems. The Textiles and Apparel industries, which together are more important in generating employment in the state than is Electrical Equipment and Communication,



TABLE IX-1

INDUSTRIES RANKED BY AMOUNTS OF RESEARCH AND DEVELOPMENT  
CARRIED OUT FROM PRIVATE AND GOVERNMENT FUNDS, 1961

<u>Ranking</u>	<u>Industry</u>	<u>Amount</u> (\$millions)	<u>Per Cent</u> <u>of Total</u>
1	Aircraft and Missiles	3,957	36.4%
2	Electrical Equipment & Communication	2,404	22.1
3	Chemicals and Allied Products	1,073	9.9
4	Machinery	896	8.2
5	Motor Vehicles and Other Trans. Eqpt.	802	7.3
6	Professional and Scientific Instruments	384	3.5
7	Petroleum Refining and Extraction	294	2.7
8	Primary Metals	160	1.5
9	Rubber Products	126	1.2
10	Fabricated Metal Products	118	1.1
11	Food and Kindred Products	105	1.0
12	Stone, Clay and Glass Products	103	0.9
13	Paper and Allied Products	60	0.6
14	Textiles and Apparel	33	0.3
15	Lumber, Wood Products and Furniture	9	0.1
	Other Industries	348	3.2
	TOTAL	<u>10,872</u>	<u>100.0</u>

Source: National Science Foundation

Table 1

The following table shows the results of the experiments conducted on the effect of temperature on the rate of reaction between hydrogen peroxide and potassium iodide.

Temperature (°C)	Time taken for reaction to complete (s)	Rate of reaction (mol dm <sup>-3</sup> s <sup>-1</sup> )
10.0	120	0.0083
15.0	90	0.0111
20.0	75	0.0133
25.0	60	0.0167
30.0	50	0.0200
35.0	45	0.0222
40.0	40	0.0250
45.0	35	0.0286
50.0	30	0.0333
55.0	25	0.0400
60.0	20	0.0500
65.0	15	0.0667
70.0	12	0.0833
75.0	10	0.1000
80.0	8	0.1250
85.0	7	0.1429
90.0	6	0.1667
95.0	5	0.2000

Notes:

1. The concentration of hydrogen peroxide was 0.1 mol dm<sup>-3</sup>.  
2. The concentration of potassium iodide was 0.1 mol dm<sup>-3</sup>.  
3. The volume of acid used was 10 cm<sup>3</sup>.



TABLE IX-2

INDUSTRY EMPLOYMENT AS PER CENT OF TOTAL NON-AGRICULTURAL  
EMPLOYMENT RANKED BY AMOUNTS OF RESEARCH PERFORMED 1961

<u>Ranking</u>	<u>Industry</u>	<u>U.S.</u>	<u>Massachusetts</u>
1	Aircraft and Missiles	1.1%	--%
2	Electrical Equipment and Communication	2.7	5.0
3	Chemicals and Allied Products	1.5	1.0
4	Machinery	2.6	3.5
5	Motor Vehicles & Other Transportation Equipment	2.7	1.4 <sup>2</sup>
6	Professional & Scientific Equipment Instruments	0.6	1.2
7.	Petroleum Refining and Extraction	3.7	--
8	Primary Metals	2.1	1.2
9	Rubber Products	0.7	1.8
10	Fabricated Metal Products	2.0	2.0
11	Food and Kindred Products	2.6	2.3
12	Paper and Allied Products	1.1	1.9
13	Textiles and Apparel	3.9	5.3
14	Lumber, Wood Products and Furniture	1.8	0.9
15	Other Industries	70.9	72.5
		<u>100.0%</u>	<u>100.0%</u>

<sup>1</sup> Some of the National and State industrial classifications are not completely comparable, nor are the National and State employment series. The qualifications necessary would not materially affect the comparisons.

Sources: U.S. Department of Labor, Bureau of Labor Statistics and Commonwealth of Massachusetts Department of Labor and Industries, Division of Statistics.

<sup>2</sup> Includes Aircraft and missiles.



Year	Month	Day	Time	Place	Remarks
1900	Jan	1	10:00	St. Paul	Arrived from New York
1900	Jan	2	10:00	St. Paul	Left for Chicago
1900	Jan	3	10:00	Chicago	Arrived from St. Paul
1900	Jan	4	10:00	Chicago	Left for New York
1900	Jan	5	10:00	New York	Arrived from Chicago
1900	Jan	6	10:00	New York	Left for St. Paul
1900	Jan	7	10:00	St. Paul	Arrived from New York
1900	Jan	8	10:00	St. Paul	Left for Chicago
1900	Jan	9	10:00	Chicago	Arrived from St. Paul
1900	Jan	10	10:00	Chicago	Left for New York
1900	Jan	11	10:00	New York	Arrived from Chicago
1900	Jan	12	10:00	New York	Left for St. Paul
1900	Jan	13	10:00	St. Paul	Arrived from New York
1900	Jan	14	10:00	St. Paul	Left for Chicago
1900	Jan	15	10:00	Chicago	Arrived from St. Paul
1900	Jan	16	10:00	Chicago	Left for New York
1900	Jan	17	10:00	New York	Arrived from Chicago
1900	Jan	18	10:00	New York	Left for St. Paul
1900	Jan	19	10:00	St. Paul	Arrived from New York
1900	Jan	20	10:00	St. Paul	Left for Chicago
1900	Jan	21	10:00	Chicago	Arrived from St. Paul
1900	Jan	22	10:00	Chicago	Left for New York
1900	Jan	23	10:00	New York	Arrived from Chicago
1900	Jan	24	10:00	New York	Left for St. Paul
1900	Jan	25	10:00	St. Paul	Arrived from New York
1900	Jan	26	10:00	St. Paul	Left for Chicago
1900	Jan	27	10:00	Chicago	Arrived from St. Paul
1900	Jan	28	10:00	Chicago	Left for New York
1900	Jan	29	10:00	New York	Arrived from Chicago
1900	Jan	30	10:00	New York	Left for St. Paul
1900	Jan	31	10:00	St. Paul	Arrived from New York

From the above it will be seen that the total number of trips made by the train during the month of January 1900 was 31. The train was in service for 31 days, and the total number of passengers carried was 1,000. The total number of freight cars carried was 100. The total number of tons of freight carried was 1,000. The total number of miles run was 1,000. The total number of hours run was 1,000. The total number of days run was 1,000. The total number of weeks run was 1,000. The total number of months run was 1,000. The total number of years run was 1,000.

spend altogether only 0.3 per cent of total research funds.

Precise information is lacking on the geographic distribution of the research which <sup>is</sup> actually performed in each industry. However, it can be noted that Massachusetts, which has about 3 per cent of the total national employment, has approximately 4 per cent of the total U.S. scientific and engineering personnel. This figure suggests a somewhat greater concentration of research in the state than the relative industrial employment figures would indicate.

Table IX-3 provides measures of the number of science personnel in Massachusetts as compared to the nation and the changes in recent years. These data do not indicate any substantial changes to be occurring in the relative availability of this basic resource. They therefore, provide some assurance of the continuance of this factor in the economic life of the Commonwealth. Scientific, engineering and technical personnel constitute the essential resource for attracting research activities to Massachusetts. The personnel are concentrated in the state's colleges and universities but many are in private industry as well.

#### The Distribution of Government Support of Research and Development

The dominance of Department of Defense contracts in Massachusetts in the total of government sponsored research and development contracts is shown clearly in Table IX-4. These contracts accounted for 73 per cent of the total funds available from the agencies listed. The ratio of Department of Defense funds to total funds for the nation as a whole was about 53 per cent. For California, by comparison, the ratio was



## SCIENCE PERSONNEL

	<u>1956-1958</u>			<u>1960</u>		
	<u>U.S. &amp; Foreign Personnel</u>	<u>Massachusetts Personnel</u>	<u>Percent of U.S.</u>	<u>U.S. &amp; Foreign Personnel</u>	<u>Massachusetts Personnel</u>	<u>Percent of U.S.</u>
Agricultural	10,598	121	1.1%	13,140	133	1.1%
Biological	21,583	833	3.9	23,901	799	3.3
Medical	2,462	116	4.2	3,287	177	5.4
Psychology	13,706	593	4.3	15,257	632	4.1
Earth Sciences	17,005	288	1.7	17,642	283	1.6
Meteorology	4,002	188	4.7	3,829	213	5.6
Geography	1,196	49	4.1	1,072	45	4.2
Mathematics	11,788	655	5.6	15,511	821	5.3
Physics	16,451	1,151	7.0	20,882	1,490	7.2
Astronomy	500	52	10.4	630	61	9.7
Chemistry	40,147	1,686	4.2	53,071	2,205	4.2
Chemical Engr.	5,208	156	3.0	6,563	172	2.6
Sanitary Engr.	4,063	158	3.9	5,226	188	3.6
Other Engr.	14,790	639	4.3	17,526	508	2.9
Other						
Specialties	3,117	128	4.1	3,755	186	5.0
	<u>166,616</u>	<u>6,813</u>	<u>4.1%</u>	<u>201,292</u>	<u>7,913</u>	<u>3.9%</u>

	<u>1962</u>		
	<u>U.S. &amp; Foreign Personnel</u>	<u>Massachusetts Personnel</u>	<u>Percent of U.S.</u>
Agricultural	12,389	116	.9%
Biological	25,554	1,025	4.0
Medical	---	---	---
Psychology	16,791	742	4.4
Earth Sciences	18,725	298	1.6
Meteorology	5,378	255	4.8
Geography	---	---	---
Mathematics	18,189	931	5.1
Physics	25,725	1,810	7.1
Astronomy	---	---	---
Chemistry	54,130	2,229	4.3
Chemical Engr.	---	---	---
Sanitary Engr.	4,923	167	3.4
Other Engr.	33,135	1,121	3.4
Other			
Specialties	---	---	---
	<u>214,940</u>	<u>8,694</u>	<u>4.0%</u>

Source: American Science Manpower 1956-58, and 1960 and 1962

The first part of the paper is devoted to a general discussion of the problem. It is shown that the problem is of great importance in the theory of differential equations. The second part is devoted to the construction of the solution. The third part is devoted to the study of the properties of the solution. The fourth part is devoted to the application of the results to the theory of differential equations.

In the first part of the paper, we consider the problem of finding the solution of the differential equation  $y'' + p(x)y' + q(x)y = r(x)$  subject to the boundary conditions  $y(a) = \alpha$  and  $y(b) = \beta$ . It is shown that the problem is solvable if and only if the function  $r(x)$  satisfies the condition  $\int_a^b r(x) dx = \beta - \alpha$ . In the second part, we construct the solution of the problem. We show that the solution can be written in the form  $y(x) = y_h(x) + y_p(x)$ , where  $y_h(x)$  is the general solution of the homogeneous equation  $y'' + p(x)y' + q(x)y = 0$  and  $y_p(x)$  is a particular solution of the inhomogeneous equation. In the third part, we study the properties of the solution. We show that the solution is unique and that it depends continuously on the data. In the fourth part, we apply the results to the theory of differential equations. We show that the results can be used to solve a wide class of problems.

The results of the paper are summarized in the following theorem:

Theorem 1. Let  $p(x)$  and  $q(x)$  be continuous functions on the interval  $[a, b]$ . Let  $r(x)$  be a function on  $[a, b]$  satisfying the condition  $\int_a^b r(x) dx = \beta - \alpha$ . Then the boundary value problem  $y'' + p(x)y' + q(x)y = r(x)$ ,  $y(a) = \alpha$ ,  $y(b) = \beta$  has a unique solution.

In the next section, we consider the problem of finding the solution of the differential equation  $y'' + p(x)y' + q(x)y = r(x)$  subject to the boundary conditions  $y(a) = \alpha$  and  $y(b) = \beta$ . It is shown that the problem is solvable if and only if the function  $r(x)$  satisfies the condition  $\int_a^b r(x) dx = \beta - \alpha$ . In the next section, we construct the solution of the problem. We show that the solution can be written in the form  $y(x) = y_h(x) + y_p(x)$ , where  $y_h(x)$  is the general solution of the homogeneous equation  $y'' + p(x)y' + q(x)y = 0$  and  $y_p(x)$  is a particular solution of the inhomogeneous equation. In the next section, we study the properties of the solution. We show that the solution is unique and that it depends continuously on the data. In the next section, we apply the results to the theory of differential equations. We show that the results can be used to solve a wide class of problems.

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TABLE IX-4

DISTRIBUTION OF FISCAL YEAR 1963 FUNDS BY SELECTED  
FEDERAL AGENCIES FOR CONTRACT RESEARCH AND DEVELOPMENT

	<u>Massachusetts</u>		<u>U. S. Total</u>	
	<u>Amount</u> (\$thousands)	<u>Per Cent</u>	<u>Amount</u> (\$thousands)	<u>Per Cent</u>
Department of Defense	328,771	72.9%	5,706,508	57.5%
National Aeronautics and Space Administration	42,480 <sup>1.7%</sup>	9.3	2,449,199	24.7
Atomic Energy Commission	13,719	3.0	1,060,602	10.7
Department of Health, Education and Welfare	51,096	11.3	504,040	5.1
National Science Foundation	14,185	3.1	131,527	1.3
Department of Agriculture	584	0.1	42,530	0.4
Department of Interior	690	0.2	19,312	0.2
Department of Commerce	393	0.1	12,060	0.1
TOTAL	<u>451,918</u>	<u>100.0%</u>	<u>9,925,778</u>	<u>100.0%</u>

Source: National Science Foundation, Report to the Subcommittee on Science, Research and Development, April-July, 1964



59 per cent.

In Massachusetts, as in the nation as a whole, the National Aeronautics and Space Administration is second to the Department of Defense as a source of research funds. In relative terms, however, this agency is less important in Massachusetts than over-all. Also, Massachusetts receives a relatively small proportion of funds from the next largest federal source of research sponsorship, the Atomic Energy Commission.

The significance of Massachusetts' colleges and universities in federally sponsored research and development is highlighted in Table IX-5.

TABLE IX-5

DISTRIBUTION OF FISCAL YEAR 1963 FUNDS TO VARIOUS TYPES OF ORGANIZATIONS FOR CONTRACT RESEARCH AND DEVELOPMENT

	<u>Massachusetts</u>		<u>United States</u>		<u>Mass. as a % of U. S.</u>
	<u>Amount</u>	<u>Per Cent</u>	<u>Amount</u>	<u>Per Cent</u>	
	<u>(\$thousands)</u>		<u>(\$thousands)</u>		
Educational Institutions	175.226	38.8%	1,492,745	15.0%	11.7%
Profit Organizations	214.534	47.5	7,987,177	80.5	2.7
Non-Profit Organizations	61.381	13.5	421.572	4.3	14.6
"Other" Performers	777	0.2	24,284	0.2	4.2
TOTAL	<u>451,918</u>	<u>100.0%</u>	<u>9,925,778</u>	<u>100.0%</u>	<u>4.6%</u>

Source: National Science Foundation, Report to the Subcommittee on Science, Research and Development, April-July, 1964.

1. The first part of the paper discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is essential for the proper management of the company's finances and for ensuring that all parties involved are kept informed of the current status of the accounts.

2. The second part of the paper deals with the various methods of recording transactions. It compares the different systems and discusses the advantages and disadvantages of each. It also provides some practical advice on how to choose the most suitable system for a particular business.

3. The third part of the paper is devoted to the subject of auditing. It explains the purpose of an audit and the steps involved in carrying one out. It also discusses the importance of having an independent auditor to verify the accuracy of the records.

4. The final part of the paper is a summary of the main points discussed. It reiterates the importance of accurate record-keeping and the need for regular audits. It also provides some concluding remarks on the overall state of the company's financial affairs.

5. The first part of the paper discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is essential for the proper management of the company's finances and for ensuring that all parties involved are kept informed of the current status of the accounts.

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Whereas in the country as a whole educational institutions performed only 15 per cent of the total reported amount, in Massachusetts this ratio, at 39 per cent was more than doubled. Private, profit making companies have a substantially smaller role in federally sponsored research in Massachusetts than in the entire nation. The share of total federally sponsored research in the U.S. which is carried out in Massachusetts by educational institutions and other non-profit organizations is 12 and 15 per cent, respectively, as compared to the 3 per cent share done by private profit-making companies. Both educational institutions and private profit-making establishments in Massachusetts concentrate relatively on research for the Department of Defense. This concentration is less extreme, however, for the colleges and universities.

As would be expected from the comparatively more important role of colleges and universities in Massachusetts, research in the state tends to be concentrated on basic problems. Applied research and development has a lesser role. This distribution of research effort undoubtedly contributes to the scientific pre-eminence of Massachusetts. However, a dollar's expenditure on basic research has a lower level of employment associated with it than a dollar spent in applied research and development.

### Conclusion

Employment in the Massachusetts economy is not relatively concentrated in the industries in which research and development is most





important. The comparatively significant role of research in the state is to a considerable extent due to the state's colleges and universities, although there are a number of outstanding examples of research-oriented private companies in the state. The direct employment effects of the basic research which is an outstanding characteristic of the college and university efforts are small and the indirect affects are spread more widely than would be true in the case of applied research and development.

The rapidly expanding prospects of such sectors as the electronics and scientific instruments industries have tended to dominate thinking about research in Massachusetts. The bulk of the state's employment is in other sectors which require special efforts to accelerate the development and introduction of new technologies. It is not likely that the state government can itself radically change this situation. However, several possibilities do exist by which the state can encourage the research and technological change. The recommendations of a recent advisory committee on science and technology and energy use to the Department of Commerce should be examined seriously and implemented where feasible. These recommendations include the publication of a directory of research facilities and services in the Commonwealth. The encouragement of the spread of new technological information by liaison with federal scientific and technical agencies and research oriented Massachusetts firms, on the one hand, and firms which are in special need of technological assistance is also suggested.



The University of Massachusetts has expressed an interest in assuming the functions performed by many state universities in carrying out scientific research and development efforts on the particular problems of the state's industries. Extension of the University's activities deserves serious consideration.





## CHAPTER X

### AID TO THE ECONOMICALLY DISTRESSED

Eleven labor market areas in Massachusetts have been certified as "designated redevelopment areas" under the Federal Area Redevelopment Act. This compares with a total of twenty-three areas either designated or eligible in New England and slightly over five hundred areas, either designated or eligible, in the United States. A listing of the Massachusetts areas and the communities involved is presented in Table X-1.

The designation of an area as one of substantial and persistent unemployment is a necessary step for a community to gain eligibility for ARA assistance. The formula for designation has a number of details but the basic idea is expressed in one of the requirements that local unemployment rates must have been 50 per cent above the national average for three of the past four years. High local unemployment rates also help determine eligibility under the "Buy American Act", for Accelerated Public Works grants and other Federal programs.

The origin of Massachusetts' redevelopment areas frequently reflects the state's long history, first of greatness and then of decline, in the fields of textile and shoe production. In the post-World War II years, textile employment dropped from 125,000 in 1948 to 43,000 in 1963, and leather and leather products employment from 75,000 in 1948 to 50,000 in 1963. The firms that remain have, merely by virtue of their staying in business, demonstrated some competitive strength, although it is by no means certain that the declines have run their course.

At present, textile and shoe employment is a comparatively minor



TABLE X-1

## DESIGNATED REDEVELOPMENT AREAS IN MASSACHUSETTS

<u>Redevelopment Area</u>	<u>Communities</u>
Dukes County	Towns of Chilmark, Edgartown, Gay Head, Oak Bluffs, Tisbury, West Tisbury and Gosnold.
Fall River	City of Fall River, Towns of Somerset, Swansea, and Westport, Massachusetts, (also includes: Tiverton, Rhode Island).
Bourne-Wareham	Town of Bourne, Town of Wareham.
Gloucester	City of Gloucester, Towns of Essex, Rockport.
Lowell	City of Lowell, Towns of Billerica, Chelmsford, Dracut, Tewksbury, Tyngsboro.
New Bedford	City of New Bedford, Towns of Acushnet, Dartmouth, Fairhaven, Marion and Mattapoisett.
Newburyport	City of Newburyport, Towns of Amesbury, Ipswich, Newbury, Rowley, Salisbury and West Newbury.
North Adams	City of North Adams, Towns of Clarksburg, Florida, New Ashford, Savoy, Williamstown and Monroe.
Plymouth	Towns of Kingston, Plymouth and Plympton.
Providence-Pawtucket (Massachusetts section)	City of Attleboro, Towns of North Attleboro, Seekonk, Bellingham, Franklin, Plainville, Wrentham, Blackstone and Millville.
Provincetown-Truro	Towns of Provincetown and Truro.





factor in the Massachusetts economy. Employment in other activities has increased, in manufactured durable goods from 281,000 in 1948 to 313,000 in 1963, and in all non-agricultural areas from 1,760,000 in 1948 to 1,956,000 in 1963.

These employment gains have not been evenly distributed however. The legacy of past greatness in non-durables is the current above-average unemployment rates for such large labor market areas in the state as Fall River, Lowell, and New Bedford. Textile and/or shoe declines are also reflected in a number of smaller areas such as Newburyport, North Adams, and Plymouth. In certain coastal communities, including Gloucester and Provincetown, fishing industry declines and seasonal variations in the resort industries are responsible for at least part of the area's unemployment.

The unemployment rates of the Massachusetts "redevelopment areas" are shown in Table X-2 along with figures with major non-designated labor market areas in the state. The table gives annual employment rates from 1958 through 1962 and monthly employment rates from January, 1963 through the summer of 1964. Also presented are the overall Massachusetts employment rates and those of the United States for the same period.

For the three large designated areas in the state, the Fall River unemployment rate has been, in recent years, usually the highest and during most of 1964; ran slightly higher than in 1963. From 1958 through 1961, the New Bedford rate was usually the state's second highest. Since 1962, however, the New Bedford rate has run slightly lower than Lowell's.





TABLE X-2

X-4

AVERAGE PER CENT OF WORK FORCE UNEMPLOYED IN MAJOR LABOR MARKET AREAS  
AND DESIGNATED REDEVELOPMENT AREAS IN MASSACHUSETTS - 1958-1964

	<u>Annual Averages</u>						<u>Monthly Averages - 1964</u>								
	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>
United States	6.8%	5.5%	5.6%	6.7%	5.6%	5.7%	6.4%	6.2%	5.9%	5.3%	5.1%	5.3%	4.9%	5.1%	5.2%
Massachusetts	7.0	5.4	5.4	6.0	5.5	5.8	7.1	6.9	6.6%	5.6	5.1	5.6	5.8	5.1	4.8
<u>Major Labor Market Areas</u>															
Boston	5.0	4.2	4.3	4.9	4.6	4.3	5.8	5.8	5.6	4.9	4.3	5.1	5.0	4.6	4.2
Brockton	10.3	7.0	7.2	7.7	7.6	8.1	10.9	10.2	9.4	7.2	6.1	6.8	7.5	5.9	5.7
Fall River*	11.8	7.9	9.0	9.3	9.4	10.0	13.2	11.4	10.9	10.3	9.7	10.1	13.2	8.6	9.3
Lawrence-Haverhill	10.1	6.8	6.7	7.5	6.2	7.2	8.1	8.3	8.1	7.0	6.2	6.4	7.4	6.6	6.8
Lowell*	11.0	8.7	8.6	9.2	8.0	8.5	10.8	11.6	10.8	8.6	7.7	7.8	8.3	7.7	7.1
New Bedford*	11.5	9.3	8.9	9.8	7.9	8.0	9.8	10.0	9.4	7.7	7.1	7.5	7.5	6.5	6.7
Springfield-Chicopee- Holyoke	8.0	6.5	6.4	7.0	6.4	6.9	7.2	7.2	7.2	6.1	5.9	6.4	6.4	5.9	5.4
Worcester	8.8	6.6	5.8	6.8	5.6	6.4	7.4	7.1	6.6	5.5	5.0	5.4	5.7	5.0	4.5
<u>Smaller Designated Redevelopment Areas</u>															
Bourne-Wareham*	--	--	13.6	13.5	11.9	12.4	22.1	22.2	20.6	17.8	9.9	9.2	--	--	--
Gloucester*	11.1	11.2	12.5	13.0	11.7	11.9	21.5	17.9	15.3	9.0	8.0	7.7	7.1	6.3	--
Newburyport*	10.1	7.4	9.0	11.9	9.8	11.9	15.4	15.6	14.4	10.7	9.1	9.0	9.7	8.4	--
North Adams*	17.0	13.3	9.1	9.5	7.8	7.2	8.7	8.1	7.8	6.6	5.6	6.0	5.6	5.3	4.9
Plymouth*	9.2	8.4	8.8	9.6	10.8	11.8	19.4	20.5	19.4	13.8	11.0	10.5	--	--	--
Provincetown-Truro*	--	--	--	14.6	15.9	16.6	38.8	38.9	33.6	18.9	11.0	3.4	--	--	--

\* Designated Area Redevelopment Areas

Source: Massachusetts Division of Employment Security



Among the smaller areas, a considerable improvement has recently been shown in the North Adams unemployment rate, which fell below the state average in the summer of 1964.

Strong seasonal variations in unemployment rates appear in the figures for the Bourne-Wareham area and the Gloucester, Plymouth and Provincetown-Truro labor market areas. Seasonality in these cases reflects a considerable dependence on outdoor and fair weather activities. These include in varying degree in these communities, tourism and resort activity, fishing, and building construction.

#### Redevelopment Efforts

In all of Massachusetts redevelopment areas, local organizations exist for the purpose of speeding the area's recovery. These organizations include the Overall Economic Development Plan (OEDP) committees established to provide a basis for local action in connection with Area Redevelopment Act assistance. Industrial Development Corporation also exist to aid in providing capital, land, buildings, and to attract industry. In the larger communities, these organizations, the local Chambers of Commerce, or the communities themselves frequently employ professionals to direct the development effort and to seek out industrial prospects.

Among the problems frequently facing local development efforts are the following:

- (1) A tendency in some quarters to think of industrial development mainly in terms of the attraction of new manufacturing firms.





Such an attitude may be somewhat unrealistic in view of the general national stability of employment in manufacturing as well as the paucity of local raw materials. Moreover, the easiest firms to attract are often footloose operators whose main interest is low-cost labor. Clearly, industrial development activity should seek firms in specific manufacturing growth industries, rather than in manufacturing generally. Many of Massachusetts' distressed areas possess an underdeveloped tourist and resort potential, to which more attention should be devoted. Upgrading of these would provide "export" earnings in the same sense as does manufacturing, although frequently at the cost of employment seasonality. Also, some of the smaller redevelopment areas possess, in view of their proximity to Boston, a commuter residence potential that is not yet fully appreciated or planned for.

(2) The complexity and at times the multiplicity of available Federal programs, which local development personnel frequently find baffling.

A considerable effort must be made to keep in touch with regional officers of Federal agencies and with State coordinators, etc., who will provide full information concerning the details of the programs.

(3) The existence of divisions in local communities concerning the objectives of, or at times, even the need for economic development.

Development bodies should endeavor to represent all community interests and to engage in full discussions of needs, problems, and objectives. The number of Federally-linked community action programs



is growing and this will place an increasing reliance upon a consensus of the community's citizens as well as the direct participation by many of them on a continuing basis.

The foregoing discussion of the problems of local economic development should not obscure the advantages possessed by many of the Massachusetts communities involved. Typically, the availability of capital is not a serious problem in that local sources can usually provide sufficient quantities to fulfill their role in the whole financing package. Also, many of the areas possess attractive coastal locations (mountainous in the case of North Adams) and historic associations that should be preserved and developed, although further pollution of harbors and rivers should be avoided and unsightly areas cleaned up. Many of the communities have a basic structure of utilities, roads, schools, governmental units, etc., which in rapid growth areas have to be newly built at considerable expense. Good quality factory space is frequently available. Finally, people are available to take new jobs or to accept training for those jobs.

In recent months redevelopment community leaders, local business men and others have worked with the appropriate Federal and State officials to take advantage of available Federal programs. The general results have been encouraging but more remains to be done. A partial inventory of these results follows.

As of Oct. 10, 1964, thirteen commercial loan projects were approved, with total ARA loans of over \$4,000,000, creating an estimated 680 jobs. As of Sept. 30, 1964, two public facility projects were approved,





with grants of nearly \$600,000, creating 400 jobs. Also, as of Sept. 30, 1964, eight technical assistance projects involving study programs, with Federal funds amounting to nearly \$500,000 were approved. Finally, as of Oct. 14, 1964, twenty-six training projects were approved with over 600 trainees.

Accelerated public works grants and loans between May 1, 1961 and June 30, 1964 totalled \$9,500,000 in redevelopment areas and \$11,750,000 in other Massachusetts labor surplus areas.

Finally, as of June 30, 1964, about 4,900 trainees were involved in 172 projects under the Federal Manpower Development and Training Act. In these programs, 1,100 persons had completed training, 1,500 were in current programs, and 2,300 were about to commence training. Programs under the MDTA take place throughout the state since the legislation does not confine them to labor-surplus areas.

Public and private redevelopment efforts are proceeding at a reasonably satisfactory if not spectacular pace. As shown in Table X-2, at least some of the communities have shown a measurable improvement in their unemployment rates, although it cannot yet be certain as to how permanent the gains are. An important factor holding down gains in unemployment rates is the fact that the communities involved, as well as the state and the nation, have entered an era of rapid growth of the teen-age labor force. The job target is not stationary, rather it is a dynamic, growing number. In view of this, even to hold unemployment rates at their present levels in the redevelopment communities will require substantial efforts by local officials and business men, and





state and federal officials.

### The Prevalence of Poverty in Massachusetts

With respect to families living in poverty (under \$3,000 of income), the situation in Massachusetts is markedly more encouraging than it is for New England generally, (Table X-3). In 1959, 12.5 per cent of Massachusetts families (amounting to 160,500 of 1,292,400 families) were living in poverty while 21.4 per cent of U.S. families were below the poverty level. For New England, the figure was 13.6 per cent.<sup>1</sup>

The currently used concepts of poverty relate to (1) those families receiving less than \$3,000 of income per year and (2) unrelated individuals receiving less than \$2,000 a year. If these money measures are taken to refer to 1964 income, the 1959 data probably overstate the prevalence of poverty in Massachusetts due to the understatement of income in 1959 and subsequent increases in income, although somewhat offset by price increases since 1959. Moreover, the chosen boundaries

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<sup>1</sup> For an excellent discussion see the article "Poverty in New England," by Edwin C. Gooding and Ruth Norr, in New England Business Review, April 1964, Federal Reserve Bank, Boston. Gooding and Norr cite several reasons why New England's poverty rates are better than those of the nation, including relatively fewer farm families, a smaller proportion of non-whites who tend to have a high incidence of poverty, relatively short community distances to city jobs for rural non-farm residents, a diversified economy offering more job opportunities for women, and generally higher education levels.



FAMILY POVERTY BY REGION AND COUNTY<sup>1</sup>

	<u>Total Families</u>	<u>Families Under \$3,000</u>	<u>Unemployed Per Cent</u>	<u>Per Cent 65 Years and Over</u>
United States	45,128,392	21.4%	5.1%	9.2%
Northeast States	11,473,669	14.2	5.2	10.1
New England	2,653,831	13.6	4.5	10.7
Massachusetts	1,292,404	12.5	4.2	11.1
Barnstable	18,165	17.4	5.2	12.7
Berkshire	36,884	13.7	5.0	11.3
Bristol	104,758	17.1	5.4	11.6
Dukes	1,569	23.0	8.3	17.4
Essex	147,713	12.8	3.8	12.1
Franklin	14,265	16.5	4.6	13.3
Hampden	110,078	12.3	5.3	10.5
Hampshire	23,332	12.5	4.0	10.6
Middlesex	307,742	9.5	3.2	10.1
Nantucket	982	18.3	4.6	14.8
Norfolk	126,959	7.3	3.4	9.8
Plymouth	62,595	12.3	5.4	11.3
Suffolk	188,638	16.3	5.0	12.1
Worcester	148,724	12.8	3.9	11.6

Source: U. S. Census Bureau, City and County Data Book, Pps. 3-4 and 172-174; and U. S. Census of 1960, Pp. 123, PC(1)-23C.

<sup>1</sup>The income data requested in the Census included money income received before deductions for taxes. Among the major items included are wages, salaries, self-employment income, social security and other pensions, unemployment compensation, public assistance, interest and dividends. On the other hand, the money equivalent of income in kind, such as food produced at home, is not included. Thus, the Census income concept represents basically the money income of the recipients. The exclusion of income in kind is significant particularly for farm families, whose incomes would probably be raised somewhat by the inclusion of this item.

Income data are available both for families and for unrelated individuals, that is, individuals not currently members of a family. In the family data the figure reported is the combined income of all members of the family. Data were also gathered for husband and wife families with two children under eighteen, in which at least the head of the family was an earner.





of poverty are necessarily arbitrary with their significance varying from case to case. Finally, it should be noted that the family poverty boundary is well below the U.S. Bureau of Labor Statistics four-person city family "modest but adequate" budget estimated at \$6,317 in Boston for the Fall of 1959.<sup>2</sup>

The Census data probably understate family and individual income as it prevailed in 1959. The reports often relied upon the memory of the respondent and it is plausible to believe that some minor or irregular sources of income may have been forgotten. This factor, however, probably is not significant in the comparisons between regions, both within and without the state, that are made here.

Almost certainly the 1959 data understate the levels of income prevailing in 1964. For example, from 1959 to 1963, Per Capita Personal Income in the state rose from \$2,436 to \$2,853, or 17 per cent. The increase was fairly widespread, including increases in wages, interest, dividends, and Social Security and unemployment benefits. The effect of increases in these items obviously would be to lift some families out of the poverty category. On the other hand, a portion of the increases in money income was needed merely to offset price increases. In January 1964, the U.S. Bureau of Labor Statistics Consumer Price Index for Boston stood at 110.1 compared with 100 in the base period 1957-1959. The Massachusetts Retail Price Index rose from the average of 100 in the 1957-1959 base period to 109.0 in

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2

This budget includes income taxes, Social Security and life insurance. The retired couple's budget, without allowance for income taxes and insurance, was estimated at a figure of \$3,304 for a "modest but adequate" level of living in Boston in the Fall of 1959.



TABLE X-4

FAMILIES AND UNRELATED INDIVIDUALS  
BELOW POVERTY LEVELS IN MASSACHUSETTS - 1959

X-12

	<u>Total</u>				<u>White</u>		<u>Non-White</u>					
	<u>State</u>	<u>Urban</u>	<u>Rural</u> <u>Non-</u> <u>Farm</u>	<u>Rural</u> <u>Farm</u>	<u>State</u>	<u>Urban</u>	<u>Rural</u> <u>Non-</u> <u>Farm</u>	<u>Rural</u> <u>Farm</u>	<u>State</u>	<u>Urban</u>	<u>Rural</u> <u>Non-</u> <u>Farm</u>	<u>Rural</u> <u>Farm</u>
<u>Families</u> (under \$3,000)	160,470	136,851	21,573	2,046	152,218	129,130	21,053	2,035	8,252	7,721	520	11
<u>Unrelated</u> <u>Individuals</u> (under \$2,000)*	236,580	208,207	27,454	919	227,675	200,220	26,544	911	8,905	7,987	910	8
<u>Husband-Wife</u> <u>Families, Head</u> <u>an Earner, two</u> <u>children under 18</u>	7,502	5,953	1,434	115	7,094	5,577	1,402	115	408	376	32	--

Source: U. S. Census of 1960.  
Pp. 144-145, PC(1)-23C

\*Unadjusted for nearly 100,000 college students.

TABLE X-5

PERCENT OF FAMILIES AND UNRELATED INDIVIDUALS  
BELOW POVERTY LEVELS IN MASSACHUSETTS - 1959

	<u>Total</u>				<u>White</u>		<u>Non-White</u>					
	<u>State</u>	<u>Urban</u>	<u>Rural</u> <u>Non-</u> <u>Farm</u>	<u>Rural</u> <u>Farm</u>	<u>State</u>	<u>Urban</u>	<u>Rural</u> <u>Non-</u> <u>Farm</u>	<u>Rural</u> <u>Farm</u>	<u>State</u>	<u>Urban</u>	<u>Rural</u> <u>Non-</u> <u>Farm</u>	<u>Rural</u> <u>Farm</u>
<u>Families</u> (under \$3,000)	12.5%	12.6%	10.9%	22.2%	12.1%	12.2%	10.8%	22.2%	30.5%	30.7%	27.9%	--
<u>Unrelated</u> <u>Individuals</u> (under \$2,000)*	56.1	55.8	58.4	63.2	56.2	55.9	58.4	63.3	54.4	54.1	57.0	--
<u>Husband-Wife</u> <u>Families, Head</u> <u>an Earner, two</u> <u>children under 18</u>	4.4	4.3	4.5	13.0	4.1	4.0	4.4	13.0	16.4	16.6	14.4	--

Source: U. S. Census of 1960.  
Pp. 145-146, PC(1)-23C

\* Unadjusted for nearly 100,000 college students.





January 1964.

Despite these warnings, however, the general picture presented by the 1959 income data summarized in Tables X-4 and X-5 is probably still substantially accurate.

### The Distribution of Poverty

Quantitatively family income inadequacy in Massachusetts is an urban phenomenon, reflecting the urban distribution of the state's population. In 1959, 137,000 urban families, about 12½ per cent of the total number of urban families, had incomes below \$3,000. Relatively, however, poverty was more prevalent among rural farm families, where 22 per cent of such families, about 2,000 families of 9,200, had incomes below \$3,000.

Poverty among unrelated individuals is currently thought of as involving an income level below \$2,000. In 1959, unrelated individuals numbered 421,000 or about 8 per cent of the total population of 5,149,000 persons. Poverty among such individuals is relatively more common than among families, with 56 per cent or 237,000 of these individuals having incomes below \$2,000 in 1959, compared to 12.5 per cent of the families below \$3,000. However, nearly 100,000 college students resided in Massachusetts in 1959. Most of these were unmarried and many lived away from home, and they probably would all agree that continuing their education involved some sacrifice of income that could be currently earned. After allowing for these we might find, as little more than a guess, 150,000 to 160,000 unrelated individuals below the poverty line or a little over 35 per cent of such individuals.



The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be carefully documented to ensure the integrity of the financial data. This includes recording dates, amounts, and the nature of the transactions.

Secondly, the document highlights the need for regular reconciliation. By comparing internal records with external statements, discrepancies can be identified and corrected promptly. This process helps in maintaining the accuracy of the accounts and prevents errors from accumulating over time.

Another key point is the importance of proper classification of expenses. Each transaction should be categorized correctly to facilitate accurate reporting and analysis. This allows management to understand the distribution of funds and make informed decisions based on the data.

The document also stresses the importance of transparency and accountability. All transactions should be clearly documented and accessible to authorized personnel. This ensures that there is a clear audit trail and that all activities are conducted in accordance with established policies and procedures.

Finally, the document concludes by reiterating the importance of consistent record-keeping. Regular updates and reviews are essential to keep the financial records current and reliable. This not only aids in the day-to-day management of the organization but also provides a solid foundation for long-term financial planning and growth.

Relatively poverty among unrelated individuals (unadjusted for the number of college students) is more common among such individuals on farms (63%) than in rural non-farm areas (58%) or in urban areas (56%). Moreover, the urban group with inadequate incomes outnumbers both the farm group and the rural non-farm group by considerable margins, partly but by no means entirely because of the numbers of college students in urban areas.

The foregoing data have indicated that in absolute terms poverty in Massachusetts is an urban phenomenon, although relatively more important in the rural areas of the state. Since the term urban areas covers all places having 2,500 or more inhabitants, further examination of the data about these areas is useful in order to increase our understanding of the nature of poverty in the state. Table X-6 presents data for the ten largest urbanized areas in the state with these areas each divided into a central city and an urban fringe. In nearly every case, the percentage of families in the central city with incomes less than \$3,000 is substantially higher than in the urban fringes, although the tendency becomes weaker in the smaller areas. A reversal of the order of percentages occurs only in the Fitchburg-Leominster urban fringe, but the percentage in the central city and urban fringe of Pittsfield show little difference.

Table X-6 also shows the percentage of the civilian labor force unemployed according to the 1960 Census. With the exception again of the Fitchburg-Leominster central city, unemployment was higher in the central cities than in the urban fringes, thus helping to explain the greater



TABLE X-6

PERCENT OF FAMILIES WITH INCOMES UNDER \$3,000  
AND UNEMPLOYMENT RATES

	<u>Total</u>		<u>Central City</u>		<u>Urban Fringe</u>	
	<u>% Fami- lies</u>	<u>% Unem- ployed</u>	<u>% Fami- lies</u>	<u>% Unem- ployed</u>	<u>% Fami- lies</u>	<u>% Unem- ployed</u>
Boston SMSA	11.3%	3.8%	16.7%	5.0%	9.3%	3.3%
Brockton SMSA	11.4	4.9	12.6	5.2	9.1	4.4
Fall River SMSA	18.3	5.9	20.0	6.2	11.1	4.7
Fitchburg- Leominster SMSA	13.2	2.9	13.2	2.9	14.1	3.6
Lawrence- Haverhill SMSA	15.1	3.6	16.7	4.0	11.4	2.8
Lowell SMSA	14.1	5.0	15.5	5.2	9.0	4.1
New Bedford SMSA	20.8	6.4	22.4	6.5	13.7	6.0
Pittsfield SMSA	12.9	4.3	13.0	4.4	12.5	2.1
Springfield- Chicopee- Holyoke SMSA	12.3	5.3	14.0	5.8	9.1	4.3
Worcester SMSA	14.0	4.2	15.4	4.3	7.7	3.6

Source: U. S. Census, Pp. 121 PC(1)-23C; Unemployment Estimates of March 1960. (These figures are frequently lower than those shown by other unemployment measures).





prevalence of central-city poverty among families.

Further, it is not surprising to find the highest rates of family poverty in the urban areas having a long history of industrial depression and the highest rates of unemployment. Thus, among the urban areas, New Bedford and Fall River led in 1959 in family poverty rates.

That the great volumes of poverty are to be found in urban central cities should not lead us to ignore other aspects of poverty in Massachusetts. If we look at county rates of family poverty we find the following counties with rates at least two percentage points above the state average: Barnstable (17.4%), Bristol (17.1%), Dukes (23.0%), Franklin (16.5%), Nantucket (18.3%), and Suffolk (16.3%) (Table X-3). Here the highest rates are shown in the island counties followed by Cape Cod, Bristol County with its economically depressed areas, then Franklin and Suffolk counties. Of these, only Bristol and Suffolk counties would be termed heavily urbanized. In several of these cases, notably Barnstable, Bristol, Dukes, and Nantucket counties, the unemployment rates were markedly above the state average.

#### The Source of Poverty

The causes of poverty undoubtedly have many aspects, and it would be a mistake to place the entire emphasis directly upon unemployment. For example, several of the counties (notably Dukes, Nantucket, Franklin and Barnstable) with high family poverty rates also have high percentages of persons 65 years and over. To a considerable extent age affects employability, but it would also seem to be an independent cause of high family poverty rates.



The comparison between whites and non-whites also provides some information on the sources of poverty. Table X-5 indicates that the percent of families having incomes under \$3,000 was markedly higher (roughly two and a half times) among non-whites than among whites. Such differences obviously reflect differences in educational and employment opportunities, as well as differences in size of personal estates and other factors.

The foregoing suggests that the description of poverty in Massachusetts is not a simple task. While much of it is found in the central cities, significant numbers of cases occur in rural areas. Age and racial factors also appear to play their part. More detailed data would probably suggest significant roles for illness, disability, educational levels, bad luck and other factors as causes of income inadequacy.

#### The Attack on Poverty

The attack upon poverty is now going on in a number of fronts. The causes of poverty are deep-seated and the process of alleviation of income inadequacy will be slow. The result, in terms of reducing human suffering, will obviously be worthwhile. In more mundane terms, savings may also be anticipated from a successful attack upon poverty in the form of reduced community welfare costs.

Much of the emphasis in the recently enacted Federal "poverty program" is upon the training of unemployed youth. That this emphasis is appropriate is suggested by the fact that, in recent months, the national unemployment rate for persons from 14 to 24 years of age has





been running in the vicinity of 15 per cent and even higher for non-whites<sup>1</sup>. The vast majority of the unemployed youth are not in school and are seeking full-time jobs. Frequently, however, necessary skills are lacking to enable them to qualify for available jobs.

Data are not available for individual states on the magnitude of the problem of youth unemployment. Some suggestion of the probable magnitude of the problem is to be found in state projections of the numbers of persons aged 14 to 19 in the labor force. In Massachusetts, the numbers of such persons at work or seeking work is expected to grow from 196,000 in 1960 to 264,000 in 1970, an increase of about 35 per cent.<sup>2</sup> This rate of increase will be higher than that for any other New England state except Connecticut. Put simply, the data mean that between 1960 and 1970 about 68,000 additional teen-age jobs, mostly full-time, must be found over and above the number of such jobs needed by 1960's unemployed teenagers.

The growth in numbers of teen-age entrants into the labor force is not expected to be spread evenly throughout the decade. From 1960 to 1965, the expected growth is 42,000 and from 1965 to 1970, 26,000. The projected figure for 1965 is 238,000 teenagers in the labor force. If 15 per cent of these were unemployed, the number would be about

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<sup>1</sup> U.S. Department of Labor, Monthly Report on the Labor Force, June 1964, P. 9, Table 5, P. 17, Chart 6.

<sup>2</sup> U.S. Department of Labor, Office of Manpower, Automation and Training, Young Workers: Their Special Training Needs, Manpower Research Bulletin No. 3, May 1963, P. 3, Table 1.





36,000, most of whom would be out of school and seeking full-time work. To provide a basis for comparison, we may note that insured unemployment in Massachusetts totalled 115,000 in January 1964 and 61,000 in June 1964. (Few unemployed teenagers would be expected to be able to qualify for unemployment compensation). In the light of this concentration of growth during the early part of the decade and the probable high unemployment rates among teen-aged persons, the recent establishment of youth training programs in the state by the Commonwealth Service Corps and others is well timed.



## APPENDIX A

### PROJECTION OF MASSACHUSETTS STATE REVENUES THROUGH FISCAL YEAR 1970

A projection of Massachusetts state revenues through fiscal years 1970, as shown in Table A-1, indicates a growth of about \$190 million from the fiscal year 1963 level, on the assumption of a steady 4 per cent growth in gross national product and a continuance of the existing state tax structure. These estimates exclude grants-in-aid from the federal government and unemployment insurance contributions which are deposited with the federal government.

After the variations resulting from recent changes in collection procedure under the personal and corporate income tax have been completed, revenue growth of about \$25 million per year is projected. Such a growth rate in revenues is 3.5 per cent, or  $1/2$  of 1 per cent less than the assumed growth rate in gross national product. Since Massachusetts income grows at about the national rate, the less than proportional increase in revenues cannot be attributed to this factor but to the revenue structure of the state. Only the most sensitive tax, motor fuel, has a projected increase of more than 4 per cent, while the major tax, individual income, rises at less than this latter rate. If state expenditures grow only at the growth rate of gross national product, an increasingly difficult fiscal problem seems inevitable.

No attempt has been made in these estimates to make allowance for economic fluctuations or price changes in the economy. But wherever possible, structural estimates have been developed to make





TABLE I

## ACTUAL AND PROJECTED MASSACHUSETTS STATE REVENUES

FISCAL YEARS 1960 - 1970  
(\$million)

A-2

	Individual Income Tax	Corporate Income Tax	Motor- Fuel Tax	Cigarette Tax	Alcoholic Beverage Tax	Inheritance & Estate Tax	Insurance Company Tax	Racing Tax	Meals Tax	Bank & Trust & Savings Banks Tax	Tax on Deeds & Instruments etc.	Public Service Corporation Tax	Motor Vehicle Excise Tax	Special Insurance Brokers Tax	Boxing Admission Tax	Motor Vehicle Fees	Other Fees Licenses etc.	Total Revenue
Actual Revenue																		
1960	154.23	88.15	76.68	39.26	26.30	20.54	18.40	12.92	8.84	7.29	1.28	6.89	.27	.14	.03	23.09	39.68	523.99
1961	158.34	96.74	79.21	41.21	27.38	25.72	19.19	13.95	9.15	12.11	1.21	7.18	.27	.15	.02	26.50	40.65	558.53
1962	178.05	101.30	81.85	42.46	27.85	21.14	20.61	14.30	9.88	11.15	1.41	6.15	.31	.15	.02	24.62	43.55	584.80
1963	186.28	105.63	84.27	43.12	28.69	27.73	21.68	14.16	10.49	11.71	1.50	9.09	.28	.16	.01	28.24	46.07	619.11
Proj'd Revenue																		
1964	1) 201.93	2) 122.06	91.03	43.24	29.75	26.89	2) 28.10	15.22	11.05	2) 14.13	1.47	2) 10.75	.27	.18	.02	27.26	48.73	672.08
1965	3) 201.50	2) 122.79	95.57	51.92	30.71	28.15	2) 29.75	15.73	11.51	2) 14.61	1.53	2) 11.50	.27	.20	.02	27.99	51.22	694.87
1966	3) 212.08	112.70	100.29	61.09	31.70	29.44	24.63	16.25	11.97	12.81	1.59	9.75	.27	.21	.02	28.75	53.70	707.25
1967	3) 219.67	115.84	105.20	62.91	32.74	30.74	30.74	25.56	12.43	13.19	1.65	10.25	.27	.22	.02	29.44	56.19	733.08
1968	3) 226.99	118.64	110.30	64.80	33.81	32.03	26.50	17.27	12.89	13.58	1.70	10.75	.27	.23	.02	30.17	58.68	756.73
1969	3) 234.86	120.81	115.61	66.77	34.93	33.33	27.44	17.78	13.36	13.96	1.76	11.25	.27	.25	.02	30.90	61.17	784.47
1970	3) 242.74	122.79	121.13	68.81	36.09	34.62	28.38	18.29	13.82	14.35	1.82	11.75	.27	.26	.02	31.62	63.66	810.42

1) Includes added revenue from change in withholding deposit law effective January 1, 1964

2) Includes added revenue from corporation prepayments instituted in January 1, 1964 and January 1, 1965.

3) Includes estimated effects of federal tax cut.

Source: Actual Revenues - Financing State Government, Massachusetts Federation of Taxpayers, 1960-1964



possible more forecasting of state revenues in the event that gross national product does not follow the smooth growth path assumed here. The major variations explaining the detailed revenues are given below, and the specific regression equations developed for estimation purposes are also provided. In general, the period covered has been from fiscal years 1948 and 1949 through 1963, based on data contained in the reports of the Massachusetts Federation of Taxpayers Associations, Financing State Government,<sup>1</sup> for each year.

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\*

#### NOTES ON SOURCES AND METHODOLOGY

Individual income tax revenues come from dividends and interest and capital gains, with no allowance for personal exemptions, and personal business income consisting primarily of wages and salaries against which exemptions are allowed. Break-downs of these categories are available for only five years, and we have used these to trace through the relationships of gross national product to national dividends and interest, capital gains and wages and salaries, to these same types of income in Massachusetts, and the proportion of such income taxable in Massachusetts. For that portion of the tax attributable to personal business income, we have taken account of personal exemptions, based on the distribution of the population in 1950 and 1960 into the relevant exemption categories and have added a variable to explain the additional collections resulting from a given income on the advent of withholding in 1959.

Corporation income tax revenues, including the excess tax, are based on the tracing through of gross national product to national corporate profits before tax and to Massachusetts collections, on the assumption that the profits of Massachusetts

<sup>1</sup> Massachusetts Federation of Taxpayers Associations Inc., Financing State Government, Boston, March 1964.





corporations behave in the same way as the national totals. Time was also added as a variable but this relationship has remained the least reliable of those we have estimated. Because there was evidence of consistent underestimate in the last three years, we have used the computed relationship in making the projection but have projected it from the average of the three years 1960-62, rather than from the mean of the series.

Revenues explained by disposable income. Three major taxes, motor fuel, alcoholic beverages and cigarettes, have been explained by real disposable income in Massachusetts after tracing out its relationship to gross national product.

Revenues explained by time. A large number of taxes have shown a steady increase through time over the period and have been projected by use of this single variable. They consist of taxes on inheritance and estates, insurance companies, racing, meals, savings banks, deed instruments, etc., public service corporations, special insurance brokers, and other fees and licenses.

Revenues requiring special calculations. A last group of revenues requiring special computations consisted of taxes on bank and trust companies, motor vehicle excises, boxing admissions, and motor vehicle fees and registrations.

## Detailed Regression Equations and Estimates

### I. Individual Income Tax Collections

#### A. Dividends and interest

$$(1) \begin{matrix} (1948-62) & (D+I) & \approx & -8.490 & + & .0595 & \text{GNP} & R^2 = .96 \\ & \text{US} & & & & (.0032) & & \text{SE} = 1.13 \end{matrix}$$

$$(2) \begin{matrix} (1949-62) & (D+I) & = & 166.983 & + & .0197 & (D+I) & R^2 = .92 \\ & \text{M} & & & & (.0016) & \text{US} & \text{SE} = 3259 \end{matrix}$$

$$(3) \begin{matrix} (D+I) & = & .866 & (D+I) \\ \text{MT} & & & \text{M} \end{matrix}$$

(This last relationship is based on the average taxable dividends 1958-62, Massachusetts Federation of Taxpayers, the only years for which information is available.)





(D+I) = Dividends plus monetary interest for the United States (billions) U.S. Department of Commerce, based on Survey of Current Business, July 1964, Table 71, and U.S. Income and Output, 1958, Table VII-16.

GNP = Gross national product in billions

(D+I) = Dividends and interest received in Massachusetts in  
M millions, U.S. Treasury Department, Statistics of  
Income.

(D+I) = Taxable dividends and interest in Massachusetts, de-  
 MT rived by capitalizing receipts from this tax, 1958-62,  
 Massachusetts Federation of Taxpayers, Financing  
 State Government.

B. Capital gains and losses

$$(1) \quad (1948-62) \quad CG = -3.787 + .0190 \text{ GNP} \quad R^2 = .81$$
$$\quad \quad \quad \text{US} \quad \quad \quad (.0025) \quad \quad \quad SE = .00$$

(2) (1957-62) CG =  $-.0152 \pm .0291$  CG  $R^2 = .78$   
M (0076) US SE = .025

$$(3) \text{ CG} = \frac{.954 \text{ CG}}{\text{MT}}$$

(This last relation derived analogously to the corresponding D+I relation.)

CG = Capital gains in the United States in billions, U.S.  
US Treasury Department, Statistics of Income, Individual  
Income Tax Returns, 1948-62.

CG = Capital gains in Massachusetts in billions, U.S. Treasury  
M Department, Statistics of Income, Individual Income Tax  
Returns, 1949-62. (State data available since 1957).

CG = Taxable capital gains in Massachusetts, derived analogously  
 MT to  $(D+I)_{MT}$ .

### C. Other individual income collections

$$(1) \quad (1948-62) \quad W_M = .5447 + .0165 \text{ GNP} \quad R^2 = .997$$
$$(\quad) \quad (\quad) \quad (.00022) \quad SE = .0814$$



$$(2) (1949-62) \log T = .0813 + .4399 \log W_M^* + .4765 \log R + .3539 D$$

$$(.1146) \quad (.3709) \quad R^2 = .96$$

$$(.1171) \quad SE = .1241$$

$W_M$  = Wages and salaries in Massachusetts in billions, U.S. Department of Commerce.

$W_M^*$  = Calculated taxable wages and salaries in Massachusetts in billions,  $W_M$  minus exemptions. The latter are based on the population distribution as follows: \$2000 for single persons, 18-65 years; \$2500 for married persons, 18-65 years; \$400 all persons under 18 years. Age distribution and married-single data are available from the 1950 and 1960 census data. Linear interpolation plus total population figures for Massachusetts provide data for other years.

Total Massachusetts population was projected using:

$$(1949-62) \text{ Pop.} = 4565 + 52.2517 t$$

$$(4.28) \quad R^2 = .937 (1964)$$

$$SE = 51.2 (t=14)$$

Pop. Massachusetts population in millions

$T$  = Individual income tax collections in millions other than dividends and interest, and capital gains computed by subtracting estimated taxes on dividends and interest, and capital gains. Estimated taxes are tax rates times the corresponding base, calculated from equations in A and B above.

$R$  = Tax rate

$D$  = 0 before 1959, 1 for 1959 and after, to reflect increased collections attributable to withholding.

## II. Corporation Income Tax Revenues

$$(1) P_t = 18.335 + .2849 \text{ GNP}_t - .2425 \text{ GNP}_{t-1}$$

$$(.0414) \quad (.0424) \quad R^2 = .8974$$

$$SE = 2.194$$

$$(2) T_t = 19.079 + 1.4034 P_{t-1} + .7663 t$$

$$(.5137) \quad (.6783) \quad R^2 = .6967 (1964)$$

$$SE = 8.0 (t=16)$$





$P_t$  = U.S. corporate profits before tax in billions in calendar year  $t$ , Economic Report of the President 1964, Table C-11.

$T_t$  = Massachusetts corporation tax collections in billions in fiscal year  $t$ , Massachusetts Federation of Taxpayers.

### III. Revenues explained by disposable income

Disposable income figures for Massachusetts are available for 1946, 50, 53, 55, 59, 61 and 63 in U.S. Department of Commerce, Survey of Current Business, August 1964. This data and the following equation were used to generate a continuous disposable income series.

$$(1) Y_{D,M} = 264.430 + .8481 Y_{P,M} \quad R^2 = .999$$

(110) (0099)

SE = 76.5

$Y_{D,M}$  = disposable income in Massachusetts (as above) in millions.

$Y_{P,M}$  = personal income in Massachusetts in millions, U.S. Department of Commerce.

$$(2) Y_{D,M}^* = .4582 + .0214 \text{ GNP}^* (1954-63) \quad R^2 = .988$$

(.0008)

SE = .117

GNP\* = GNP deflated by consumer price index, in billions

$Y_{D,M}^*$  =  $Y_{D,M}$  deflated by the consumer price index, in billions

$$(3) \text{Motor Fuel (1949-63)} \quad R^2 = .973$$

$$T = -486.98 + .1727 Y_{D,M}^* \quad SE = 40.8$$

(.008)

$T$  = motor fuel collections in millions of taxable gallons (current rate = \$.055/gallon), Massachusetts Federation of Taxpayers.

$Y_{D,M}^*$  = real disposable income in millions.

$$(4) \text{Alcoholic Beverages (1949-63)}$$

$$T = 2.183 + .00089 Y_{D,M}^* \quad R^2 = .924$$

(.00007)

SE = .364

$T$  = alcoholic beverage collections in millions of taxable



gallons (current rate = \$2.25/gallon), Massachusetts Federation of Taxpayers.

(5) Cigarettes (1949-63)

$$T = 174.982 + .0440 Y_{D,M}^* \quad R^2 = .874$$

$$(.005) \quad SE = 23.8$$

T = cigarette collections in millions of taxable packages (rate = \$.06 per package), Massachusetts Federation of Taxpayers.

IV Revenues explained by time \*

$$(1) \text{ Inheritance \& Estate} = 10.041 + 1.294t \quad R^2 = .891$$

$$(.136) \quad SE = 1.84$$

$$(2) \text{ Insurance} = 10.108 + .937t \quad R^2 = .996$$

$$(.016) \quad SE = .22$$

$$(3) \text{ Racing} = 8.581 + .511t \quad R^2 = .935$$

$$(.041) \quad SE = .55$$

$$(4) \text{ Meals} = 5.051 + .461t \quad R^2 = .974$$

$$(.021) \quad SE = .16$$

$$(5) \text{ Deeds, Instruments, etc.} = 791 + .057t \quad R^2 = .844$$

$$SE = .09$$

$$(6) \text{ Public Service Corporation} = 3.019 + .498t \quad R^2 = .844$$

$$(.076) \quad SE = .08$$

$$(7) \text{ Special Insurance Brokers} = .001 + .013t \quad R^2 = .976$$

$$(.0006) \quad SE = .008$$

$$(8) \text{ Other fees, licenses, etc.} = 16.373 + 2.488t \quad R^2 = .932$$

$$(.202) \quad SE = 2.72$$

All dependent variables are collections in millions (Massachusetts Federation of Taxpayers).

\*All equations based on 1951-63 data (t=13, 1964) except for:

1.) Deeds, Instruments, etc. (1953-63) (1964, t = 12)

2.) Public Service Corporation (1954-63) (1964, t = 11)

due to irregularities in collection procedure.



# V. Revenues requiring special calculations

- (1) Bank and Trust company. Linear interpolation to reach by 1970 the maximum between 1959 and 1963.
- (2) Motor vehicle excise - assumed constant at the average value 1958-63.
- (3) Boxing admissions - assumed constant at the average value 1958-63.
- (4) Motor vehicle fees and registration - based on two regressions:

(1948-63) $A = 923.48 + 53.05t$	$R^2 = .996$	(1964)
(.91)	$SE = 16$	(t=17)
(1953-63) $L = 1750.81 + 55.20t$	$R^2 = .996$	(1964)
(.17)	$SE = 17$	(t=13)

A = number of autos in millions, from Registry of Motor Vehicles.

L = average number of licensed operators in millions, from Registry of Motor Vehicles.

Licenses were halved, then multiplied by \$5 to give license revenue. Autos were multiplied by \$6 to give registration revenue. These were added and expressed as ratios of total revenue from licenses and registration over the past 6 years. This average ratio and the two equations were used to predict total revenue.





## APPENDIX B

Legislation creating a Board of Economic Advisors to the Governor was enacted during the 1964 session of the General Court and signed into law by the Governor on July 1, 1964, with an emergency preamble providing for its immediate establishment.

The activation by statute of this economic advisory body and the appropriation of \$50,000 for compensation of its members and staff and operation of its office for the fiscal year 1965 achieved a goal envisaged in Governor Peabody's program.

Recognizing that the major problems facing the government of the Commonwealth were often and increasingly economic in character, in July, 1963, the Governor invited three professional economists to act as an ad hoc economic advisory body, to determine what role a permanent body might usefully fulfill, and to make appropriate recommendations for the constitution of this body by law.

The economic rôle of state governments has increased in importance following World War II as the result of the relatively greater growth in state budgets as compared with that of the federal government. Increasing competition between the states for shares of the growth increments of the economy, particularly in the industrial sector, has contributed to state economic policies. The need for sound economic and financial advice at the level of state government has also been increased by a growing tendency on the part of the federal government to



return tax monies to the states through various federally legislated programs, many of which involve "matching funds" from state governments.

#### Advisory Functions in Other States

The economic advisory role has evolved in state governments in a variety of ways ranging from informal part-time participation to specific, statutorily-defined duties. Some state governments have a working relationship with their state universities on matters involving economic analysis and advice. State fiscal problems have been the object of special studies by state universities as, for example, the Minnesota State Tax Study Commission Report, prepared under the direction of the Department of Economics, University of Minnesota 1955-56. Another method for developing economic advice used by some states has been the creation of informal, and usually large, advisory councils made up of unpaid citizens drawn from various sectors of the state's economy. Examples are the Advisory Council on the Virginia Economy, 1963, (45 members), the Illinois Council of Economic Advisers, 1962, (15 members), and the Montana Governor's Committee on Economic Studies, 1961, (50 members). A few states, having no specific economic advisory body, develop economic data through their state planning agencies as is the case in Tennessee where the State Planning Commission will soon publish a study of Resources of Tennessee, with the first volume being "Economic Trends in Tennessee". In Oklahoma the Department of Commerce and Industry





is charged with an economic research function. Other states have specific and defined economic advisory tasks and bodies to carry them out either by statute or through executive order. New Jersey has a Governor's Cabinet Economic Committee, established by the Governor in 1962, to inform the office of the Governor and the Cabinet on current economic developments at the state and national level and their policy implications. This committee has an economic advisor, a professor at the state university. It publishes a monthly economic report, reviewing the economy of the state and the nation. Hawaii has an Economic Research Center, established by a legislative act in 1959 as a research department of the University of Hawaii to evaluate the economic effects of proposed and enacted legislation and to perform basic economic research for various state government agencies.

At present three other states beside the Commonwealth of Massachusetts have defined responsibilities for producing an annual economic report. They are:

- 1) West Virginia - which has a Council of Economic Advisors created by executive order of the Governor in 1962, patterned after the federal agency with five members paid a modest annual stipend and making a private report to the Governor.

- 2) California - where the Governor is required by a 1963 law to transmit to the legislature an annual economic report focusing on a full employment analysis and policy, in the prep-



aration of which he shall utilize his staff and the resources of state agencies responsible to him.

3) Kansas - which has an Office of Economic Analysis at the University of Kansas, created by statute in 1963, and required to submit to the Governor and legislature an annual report to assist in private and public planning for economic growth and development.

#### The Ad Hoc Board

Governor Peabody's ad hoc advisory body, named the Board of Economic Advisors to the Governor, began, immediately after its creation, to investigate the areas in which it could best serve the Governor and the Commonwealth.

A statement of purpose was prepared in July, 1963 defining the scope of the work upon which the Board would focus its efforts. This statement not only set forth the general functions of an advisory body, recognizing the long-range analysis of the Commonwealth's economic position as its primary concern, but also spelled out the structural organization of the Board, which would:

1. Consist of three economists with one designated as Chairman.
2. Hold semi-monthly meetings, sometimes with other experts or with the Governor.
3. Employ a trained staff to conduct research and contract for special research projects with competent consultants when funds become available.



4. Arrange for joint federal-state participation in research tasks of mutual interest.

The Board's activity on the Governor's behalf was entirely voluntary during the period from July, 1963 to July, 1964, there being no funds available either to compensate the advisors themselves or to employ staff or consultants. An unsuccessful effort was made during this period to determine whether federal funds might be available for research which the state should be undertaking. During this period Joseph F. Courtney, then of the Department of Administration and Finance provided liaison and organizational assistance. Guy Black, then of M.I.T. contributed his services for a substantial period in helping the Board to organize. Recognizing the effects on the Massachusetts economy of cutbacks in spending in the defense sector by the federal government, in August, 1963, the Board of Economic Advisors prepared detailed proposal for the U. S. Arms Control and Disarmament Agency to study Regional Economic Adjustments to Declines in Defense Demand, naming Massachusetts as the region involved. This proposal was forwarded to the Agency in late February, 1964 by the Commissioner of Administration as a specific bid by the Commonwealth for the contract study. A team of more than twenty economists in different fields from five universities in the Commonwealth was assembled to participate in the study.

In 1963, the Board was asked by Commissioner John B. Hynes





of the State Division of Banks to conduct an analysis of interest rates which the Division of Banks could use as the basis of testimony at the hearings of the Small Loans Advisory Board scheduled for the spring of 1964. A contract was signed with the Division of Banks and was carried out by the Board with the assistance of Harry L. Barrett Jr., Professor of Finance at Boston University. Preparation of Testimony with a View to Presentation at a Hearing of the Small Loans Board was subsequently delivered to the Division of Banks.

The Board developed a list of suggestions for economic indicators. Such indicators would be useful in interpreting the economy and forecasting its likely future course.

Acting under a directive spelled out in the Governor's Annual Message for 1964, Professor James Nelson, Chairman of the Board, began the work of analyzing the inter-state transportation problems of the Commonwealth. Chairman Nelson acted as the Governor's representative to the New England Governors' Committee on Interstate Rail Transportation, an ad hoc group established by the New England Governors' Conference early in 1964. The six-state conference concerned itself with the freight problems of New England railroads generally, and with the New York, New Haven and Hartford and the Boston and Maine Railroads in particular.

Chairman Nelson was also requested by the Governor to assist in a presentation to the Secretary of the Interior Stewart



Udall, stressing New England's and Massachusetts' unfavorable economic position resulting from federally-imposed residual oil import quotas.

The Board was also requested in the Governor's Annual Message to "examine the feasibility of the Commonwealth's developing a massive center for science research." The Board discussed the matter with a number of leaders in the scientific community and subsequently made a report to the Governor indicating that, while certain tasks might usefully be undertaken by a state scientific body, a thorough investigation should be carried out by a board of scientists, research administrators and educators to evaluate possible alternatives.

#### The Statutory Board

In his 1964 Annual Message, Governor Peabody recommended that "The Board of Economic Advisors be made permanent and provided with adequate staff for research and analysis." His recommendation was fulfilled by the legislature with the passage of an Act creating a Board of Economic Advisors. The Board, under Chapter 7 Section 37 of The General Laws of the Commonwealth, resides in the Executive Office for Administration and Finance, but operates independently. An office at 15 School Street, Boston, was opened in September, 1964.

The Board is specifically charged, in the law,

1) to make a continuing study of the economy of the Commonwealth,





2) to render an annual economic report to the Governor and the Legislature.

3) to report to the Governor on such problems he may present to the Board, and

4) to consult with the Commissioner of Administration and Finance upon his request.

The Board's objective has been to develop an operating office with a professional staff. David Bird of the Executive Office for Administration and Finance has provided invaluable assistance in his role as Secretary to the Board.

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\*

While assuming full responsibility for this report, the Board acknowledges the valuable assistance of the following persons:

University of Massachusetts

Marshall C. Howard  
Robert S. Bond  
N. Eugene Engel  
C. R. Lockard

Robert L. Rivers  
A. J. W. Schaffey  
David A. Storey  
Kenneth P. Wickman

Edward A. Zane

Boston University

Harry L. Barrett, Jr.  
James W. Kelley  
John B. Read, Jr.  
Joseph F. Courancy

Massachusetts Institute of Technology

E. Cary Brown  
Robert Evans, Jr.  
Terence J. Wales  
Robert A. Schmitz



Guy Black, Washington, D.C. and Nancy Dorfman, Belmont, Mass.

We are grateful to Thomas M. Raftery, Director, and the staff of the Division of Statistics, Massachusetts Department of Labor and Industries, F. William Belanger Director, and the staff of the Massachusetts Division of Employment Security and Norman Mason, Chairman, and the staff of the Massachusetts Department of Public Utilities for their cooperation and assistance. The Massachusetts Federation of Taxpayers Associations, Inc. and the New England Regional Office of the Bureau of Labor Statistics of the U.S. Department of Labor also provided useful data, and the Federal Reserve Bank of Boston.



TABLE C-1

## CAPITAL EXPENDITURES FOR MASSACHUSETTS MANUFACTURING, 1963 (thousands of dollars)

INDUSTRY		ACTUAL COST	ACTUAL PLANT	ACTUAL EQUIP.	PLANNED TOTAL	PLANNED PLANT	PLANNED EQUIP.
ALL MANUFACTURING		300,493	69,513	230,980	306,870	61,232	245,638
DURABLE GOODS		152,868	29,761	123,107	167,269	32,579	134,690
19	Ordance	4,272	1,050	3,222	7,083	1,919	5,164
33	Primary Metals	10,534	1,723	8,811	11,119	1,390	9,729
34	Fabricated Metals	21,874	3,799	18,075	43,149	8,198	34,951
35	Machinery	33,662	4,379	29,283	33,821	4,498	29,323
36	Elec. Machinery	34,373	7,210	27,163	40,365	9,244	31,121
37	Transp. Equipment	6,647	641	6,006	6,441	1,140	5,301
38	Instruments	25,655	4,470	21,185	9,742	2,289	7,453
24	Lumber & wood	1,885	403	1,482	1,276	221	1,055
25	Furniture	4,101	2,481	1,620	3,512	2,044	1,468
32	Stone, Clay & Glass	9,865	3,605	6,260	10,761	1,636	9,125
NONDURABLE GOODS		147,625	39,752	107,873	139,601	28,653	110,948
20	Food	33,500	13,984	19,516	24,341	8,422	15,919
22	Textiles	18,122	2,608	15,514	19,428	3,419	16,009
23	Apparel	5,773	629	5,144	3,808	308	3,500
26	Paper	22,837	2,746	20,091	28,884	4,824	24,060
27	Printing	18,500	5,038	13,462	12,242	1,542	10,700
28	Chemicals	14,009	4,900	9,109	16,833	4,781	12,052
30	Rubber	15,338	1,952	13,386	19,222	1,653	17,569
31	Leather & Shoes	9,870	3,650	6,220	9,480	2,095	7,385
39	Miscellaneous (incl. tobacco & petroleum)	9,676	4,245	5,431	5,363	1,609	3,754

SOURCE: Federal Reserve Bank of Boston





TABLE C-2

CAPITAL EXPENDITURES FOR MASSACHUSETTS MANUFACTURING, 1964  
(thousands of dollars)

INDUSTRY	PLANNED TOTAL	PLANNED PLANT	PLANNED EQUIP.
ALL MANUFACTURING	337,834	67,988	269,846
DURABLE GOODS	161,353	25,311	136,042
19 Ordnance	3,983	575	3,408
33 Primary Metals	12,109	991	11,118
34 Fabricated Metals	27,615	4,901	22,714
35 Machinery	37,199	4,231	32,968
36 Electrical Machinery	29,135	4,010	25,125
37 Transportation Equip.	10,122	1,665	8,457
38 Instruments	26,990	5,311	21,679
24 Lumber & Wood Prod.	1,276	113	1,163
25 Furniture	3,884	1,558	2,326
32 Stone, Clay & Glass	9,040	1,956	7,084
NONDURABLE GOODS	176,481	42,677	133,804
20 Food	35,592	10,675	24,917
22 Textiles	17,051	3,511	13,540
23 Apparel	8,223	3,709	4,514
26 Paper	33,590	4,096	29,494
27 Printing	16,696	3,621	13,075
28 Chemicals	22,546	3,969	18,577
30 Rubber	17,424	2,844	14,580
31 Leather & Shoes	9,659	2,758	6,901
39 Miscellaneous (incl. tobacco & petroleum)	15,700	7,494	8,206

SOURCE: Federal Reserve Bank of Boston



TABLE E-1  
TOTAL NON-AGRICULTURAL EMPLOYMENT -- MASSACHUSETTS

<u>YEAR</u>	<u>JAN.</u>	<u>FEB.</u>	<u>MAR.</u>	<u>APR.</u>	<u>MAY</u>	<u>JUN.</u>	<u>JUL.</u>	<u>AUG.</u>	<u>SEP.</u>	<u>OCT.</u>	<u>NOV.</u>	<u>DEC.</u>
1954	1814.9	1810.9	1803.8	1799.9	1790.7	1785.1	1783.6	1778.3	1779.0	1782.5	1785.1	1789.5
1955	1795.8	1794.7	1801.9	1808.4	1810.3	1813.0	1818.7	1820.9	1832.3	1834.3	1842.0	1844.5
1956	1851.2	1862.4	1861.6	1857.7	1864.2	1867.7	1863.0	1871.9	1861.3	1870.5	1873.0	1879.5
1957	1879.3	1885.1	1884.4	1886.5	1880.2	1875.3	1873.9	1868.8	1861.1	1863.2	1853.9	1854.8
1958	1841.2	1831.7	1820.4	1811.1	1809.5	1811.6	1817.6	1824.5	1834.7	1838.4	1845.7	1849.8
1959	1856.0	1864.1	1868.9	1876.5	1889.7	1895.2	1898.8	1900.0	1904.5	1908.8	1908.5	1918.0
1960	1917.7	1914.4	1912.9	1924.3	1919.2	1918.8	1924.3	1923.5	1918.0	1902.8	1914.6	1909.1
1961	1913.8	1916.2	1920.2	1918.1	1923.4	1929.0	1929.4	1931.8	1935.0	1940.1	1946.9	1950.2
1962	1952.3	1953.5	1955.8	1962.1	1961.0	1963.2	1958.2	1959.1	1961.9	1958.5	1956.0	1954.6
1963	1951.9	1955.2	1954.4	1950.2	1955.0	1952.2	1957.6	1958.7	1956.7	1958.9	1960.1	1960.3
1964	1964.0	1963.5	1965.2	1960.7	1969.6	1968.5	1971.3	1968.7	1966.5	1972.2		

ADJUSTED DATA ARE DERIVED FROM SEASONAL INDEXES CARRIED TO  
A LARGER NUMBER OF DIGITS THAN ARE SHOWN IN TABLE 12.





Table F-1. Quantity of Fish Landed, Massachusetts, New England and U.S.  
(Million pounds)

Year	Boston <sup>a/</sup>	Gloucester	New Bedford	Provincetown	Mass.	New England	U. S.
1963	107.2	138.8	135.3	25.3	469.6	844.0 <sup>b/</sup>	4750
1962	117.9	167.2	119.8	19.6	493.4	871.7	5354
1961	117.3	163.1	100.4	22.8	470.8	760.1	5187
1960	110.9	192.4	85.1	27.0	480.4	852.0	4942
1959	113.7	229.0	108.0	26.7	537.6	933.2	5122
1958	123.8	230.0	112.0	26.3	554.8	997.7	4747
1957	135.6	249.0	104.0	25.1	581.1	1030.9	4789
1956	147.2	252.0	88.0	21.7	575.3	1015.2	5268
1955	136.5	254.0	83.0	23.3	566.4	955.4	4809
1954	151.2	232.0	72.0	22.5	561.1	966.4	4762
1953	152.3	186.0	75.0	20.1	510.0	864.0	4487
1952	173.1	222.0	75.0	17.0	581.2	954.6	4432
1951	170.9	260.0	79.0	17.6	633.2	916.8	4433
1950	170.0	196.0	117.0	15.7	591.2	1006.6	4901
1949	171.8	251.0	106.0	13.2	647.6	1000.0	4804
1948	199.5	251.0	78.0	20.1	649.7	998.4	4513

Source: Four ports - New England Fisheries, Annual Summary, 1963, Market News Service,  
U.S. Bureau of Commercial Fisheries; Massachusetts, New England and U.S.,  
Statistical Abstract of the U.S., U.S. Department of Commerce

a/ Includes Atlantic Avenue, 1959-63 only  
b/ Not including Connecticut and New Hampshire



Table F-2. Value of Fish landed, Massachusetts, New England and U.S. (million dollars)

Year	<sup>a/</sup> Boston	Gloucester	New Bedford	<sup>c/</sup> Provincetown	Mass.	<sup>b/</sup> New England	U.S.	Mass. % of US
1963	10.8	6.6	17.4	1.3	41.1	66.4	378.2	10.9
1962	10.5	6.4	16.5	1.3	40.3	65.8	396.4	10.2
1961	9.5	6.0	14.8	1.3	36.9	60.9	362	10.2
1960	9.7	6.3	13.2	1.4	35.9	61.5	354	10.1
1959	11.3	7.1	15.7	1.4	40.9	66.2	346	11.8
1958	12.6	8.0	13.7	1.5	40.9	65.5	373	11.0
1957	11.2	7.0	13.1	1.2	37.9	60.8	354	10.7
1956	10.5	7.4	12.3	-	36.2	59.3	372	9.7
1955	9.2	7.9	12.0	-	35.1	57.2	339	10.4
1954	10.8	8.2	10.3	-	35.2	57.6	359	9.8
1953	12.1	7.0	11.8	-	37.8	60.1	356	10.6
1952	14.3	9.6	13.1	-	44.3	67.3	364	12.2
1951	14.3	12.7	11.9	-	46.8	67.4	365	12.8
1950	13.4	9.0	11.3	-	40.8	60.6	347	11.8
1949	12.1	10.5	9.7	-	39.0	58.5	343	11.4
1948	16.1	11.2	11.8	-	46.7	68.0	371	12.6

Source: Four ports - New England Fisheries, Annual Summary, 1963, Market News Service, U.S. Bureau of Commercial Fisheries; Massachusetts, New England and U. S. - Statistical Abstract of the U.S., U. S. Department of Commerce

- <sup>a/</sup> Includes Atlantic Avenue, 1959-63 only  
<sup>b/</sup> Not including Connecticut and New Hampshire  
<sup>c/</sup> Not available before 1956.



Table F-3. Quantity of Fish Landed, by Species, Massachusetts (Thousand Pounds)

Year	Haddock	Flounder	Ocean Perch	Cod	Scallops Sea	Whiting	Total <sup>a/</sup>
1963	120,940	91,881	44,387	37,221	16,608	66,770	467,693
1962	131,558	75,796	54,530	40,647	19,549	75,384	493,414
1961	130,478	59,030	54,712	38,166	21,035	74,010	470,774
1960	114,643	52,218	63,175	31,266	20,586	87,348	480,421
1959	109,101	46,851	61,478	36,576	19,109	83,134	537,614
1958	115,517	48,725	77,577	33,593	16,002	81,066	554,779
1957	128,631	42,213	69,208	28,390	18,004	107,972	581,062
1956	147,051	35,926	86,146	29,127	15,815	72,445	575,332
1955	130,083	39,817	89,303	28,526	15,515	81,834	566,413
1954	148,968	36,574	101,781	29,991	14,825	78,050	561,068
1953	133,856	38,090	93,271	27,465	18,249	71,858	510,035
1952							
1951							
1950							
1949							
1948							

Source: New England Fisheries, Annual Summaries, C.F.S. Series, Bureau of Commercial Fisheries, Washington, D.C.

a/ Includes other species less important than those listed separately.





Table F-4. Value of Fish Landed, by Species, Massachusetts (Thousand dollars)

Year	Haddock	Flounder	Ocean Perch	Cod	Scallops Sea	Whiting	Total <sup>a/</sup>
1963	11,444	7,759	2,211	2,640	7,709	1,563	41,234
1962	10,701	7,360	2,356	2,760	7,979	1,656	40,265
1961	9,666	6,264	2,172	2,361	8,010	1,616	36,900
1960	9,091	6,373	2,410	2,021	7,165	1,950	35,947
1959	10,626	6,069	2,549	2,572	9,242	1,682	40,870
1958	11,389	5,772	3,273	2,470	7,743	1,952	40,933
1957	9,869	5,244	2,693	1,739	8,736	1,970	37,936
1956	9,281	4,589	3,259	1,774	8,539	1,314	36,182
1955	7,805	5,005	3,460	1,669	8,122	1,486	35,057
1954	9,595	4,401	4,170	1,768	6,667	1,646	35,213
1953	10,146	4,751	3,610	1,847	8,057	1,398	37,846
1952							
1951							
1950							
1949							
1948							

Source: New England Fisheries, Annual Summaries, C.F.S. Series, Bureau of Commercial Fisheries, Washington, D.C.

<sup>a/</sup> Includes other species less important than those listed separately.



Table F-5. Fishermen, Massachusetts and New England

Year	Massachusetts Fishermen				New England Fishermen			
	On Vessels	On Boats and Shore Regular	Casual	Total	On Vessels	On Boats and Shore Regular	Casual	Total
1963	3353	817	5715	9,885	4,202	5,786	11,440	21,428
1962	3416	836	6000	10,252	4,184	6,638	10,727	21,549
1961	3426	859	5603	9,888	4,231	7,044	10,462	21,737
1960	3515	1,018	5641	10,174	4,349	7,510	10,341	22,200
1959	3718	881	4366	8,965	4,501	7,204	9,346	21,051
1958	3699	849	4614	9,162	4,517	7,112	10,160	21,789
1957	3973	816	4469	9,258	4,914	7,551	9,823	22,288
1956	4091	992	3219	8,302	5,151	7,904	8,321	21,376
1955	4074	1,191	3795	9,060	5,226	7,267	10,073	22,566
1954	4496	1,390	3581	9,467	5,544	8,032	9,772	23,348
1953	5102	1,057	4586	11,195	7,001	7,777	11,614	26,392
1952								
1951								
1950								
1949								
1948								

Source: New England Fisheries, C.F.S. Series, Annual Summaries, Bureau of Commercial Fisheries, Washington, D.C.





Table F-6. U.S. Supply, Domestic Production and Imports, All Fishery Products, and Groundfish and Ocean Perch Fillets

Year	U.S. fishery products <sup>a/</sup>				Groundfish and ocean perch fillets <sup>b/</sup>			
	Million pounds			Imports % of total	Million pounds			Imports % of total
	Total Supply	Domestic catch	Imports		Total Supply	Domestic Production	Imports	
	*		*		*		*	
1963	11230	4750	6480	58	315,057	83,329	231,728	74
1962	10375	*5354	5021	48	314,968	93,548	221,420	70
1961	9544	5187	4357	46	288,138	93,039	195,099	68
1960	8195	4942	3253	40	249,368	93,818	155,550	62
1959	8432	5122	3310	39	275,970	91,133	184,837	67
1958	7497	4747	2750	37	245,663	99,074	146,589	60
1957	7148	4789	2359	33	237,328	96,650	140,678	59
1956	7555	5268	2287	30	242,433	107,138	135,295	56
1955	7112	4809	2303	32	233,469	105,157	128,312	55
1954	7591	4762	2829	37	259,939	122,391	137,548	53
1953	7015	4487	2528	36	201,986	112,280	89,706	44
1952	7636	4432	3204	42	240,063	132,662	107,401	45
1951	6757	4433	2324	34	235,828	148,786	87,042	37
1950	6547	4901	1646	25	201,372	136,572	64,800	32
1949	6041	4804	1237	21	187,400	140,073	43,322	25
1948	--	--	--	--	191,722	137,758	53,964	28

Sources: Fisheries of the United States, 1962-63 issues, Branch of Statistics, Bureau of Commercial Fisheries, Washington, and Landings and Prices of Fishery Products, Boston Fish Pier, 1952, Market News Service, U. S. Bureau of Commercial Fisheries, Boston.

\* Record

<sup>a/</sup> Edible and industrial products, round weight basis

<sup>b/</sup> Haddock, cod, hake, cusk, pollock and ocean perch. Domestic production is fillet weight, not roundweight. Imports are weight of fillets and frozen blocks of fillets

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